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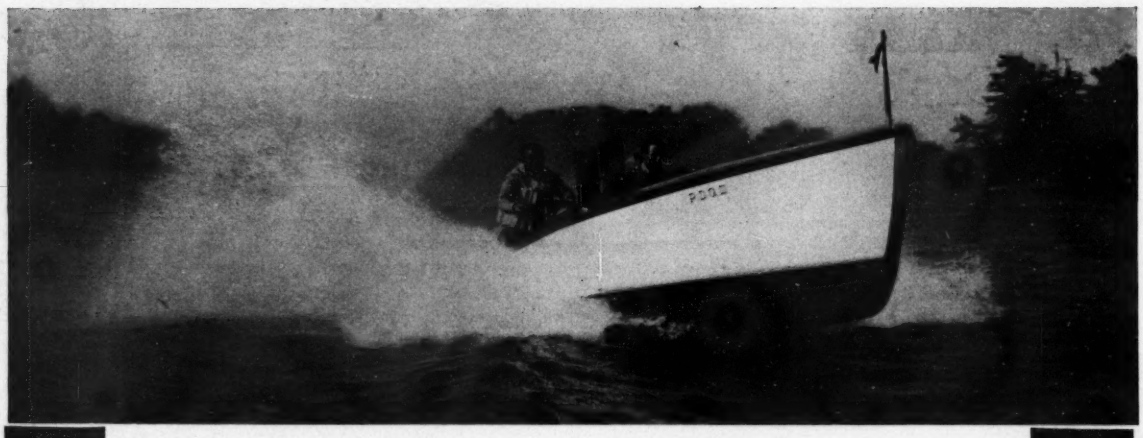

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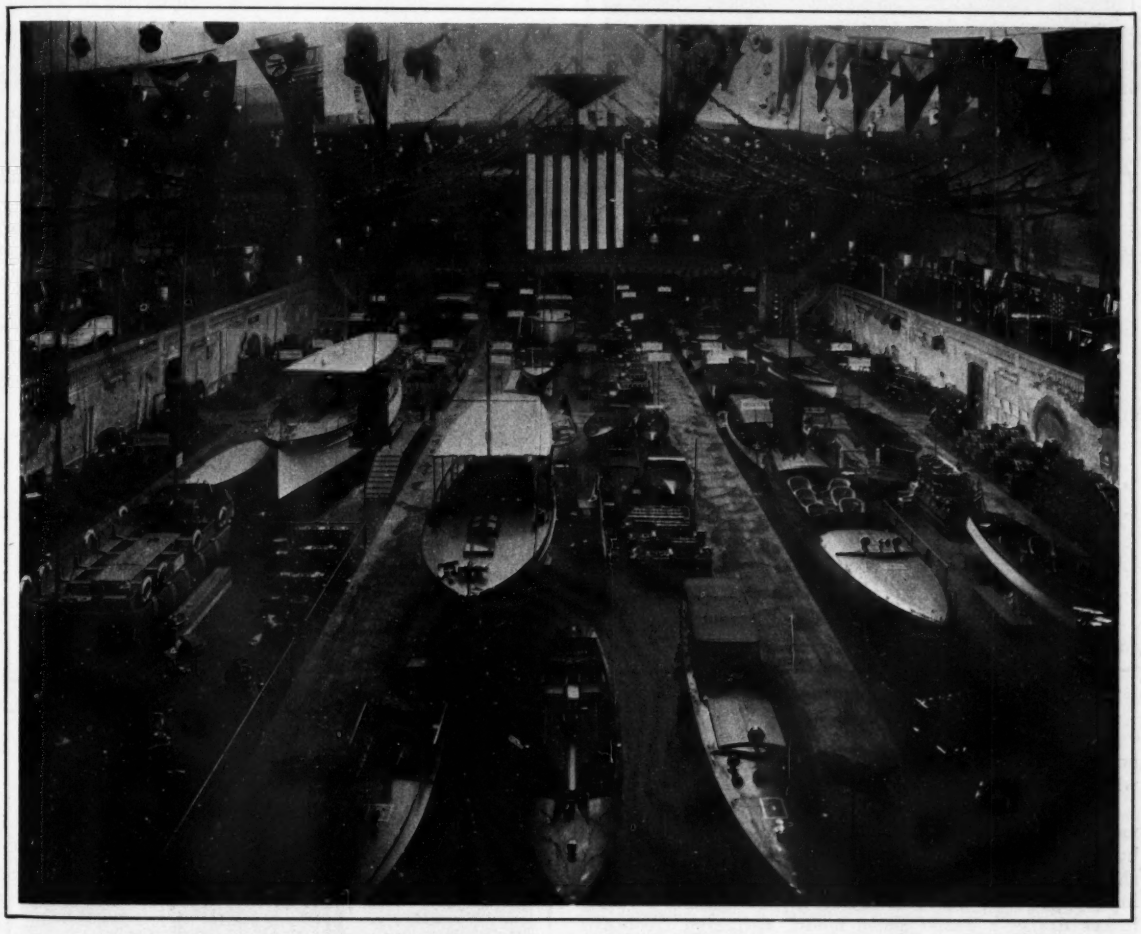
THE BROADENING DEMAND FOR AMERICAN MOTOR BOATS

Some Tendencies Exhibited by 1914 Models and Growing Popularity of the Latest Types of Marine Engines

By Wm. B. Rogers, Jr., Editor of "Motor Boat," New York

A WEEK spent at the Tenth Annual Motor Boat Show, held at New York City, impressed the writer more strongly that ever before with the fact that the motor boat industry in the United States is developing rapidly into a business of world-wide importance. Once these same manufacturers seemed contented with a trade of more or less local character. Nearly all of them began in this way, supplying the public of their own city and surrounding territory with boats and motors suitable for local conditions. But this situation lasted only for a short time, for the great demand for motor boats, not only in all parts of the North American Continent but in the most remote districts of the globe, soon caused these manufacturers to broaden the scope of their business and look for markets everywhere.



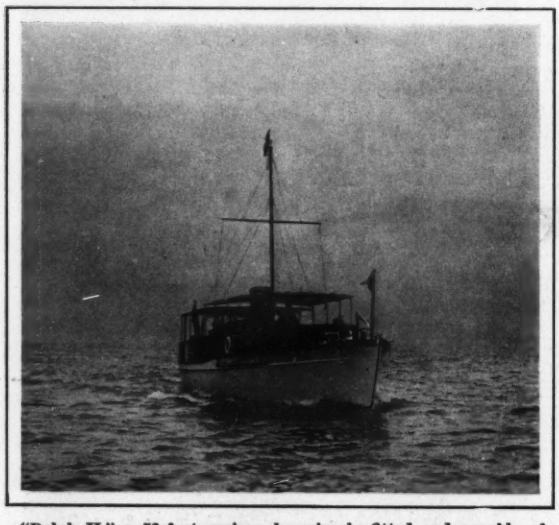
General view of Madison Square Garden, New York, during the Tenth Annual Motor Boat Show. A number of high-class, beautifully finished speed boats can be seen in the immediate foreground

Within the four walls and beneath the vast dome-like roof of historic Madison Square Garden, appeared the latest products of American manufacturers. Among the several hundred exhibits were to be found motor boats designed for every use, for pleasure and for business, suitable for conditions of every conceivable sort. Just to mention two extremes; looming above all other boats was a 50-foot cruiser representing the highest skill obtainable in design, construction and equipment. Her furnishings included every necessity and every luxury which might be found in the best of homes. She was a vessel upon which the owner, his family and guests might live for months, might cruise indefinitely without feeling a single inconvenience or noticing a solitary discomfort. Her hull, built of the finest of woods and finished in hand-rubbed mahogany with brass fittings was a beautiful thing, but could in no sense be called a toy or a plaything. She was a beautiful boat, also an able one, a craft for a wealthy owner. Her price was $10,000. Not far away was another motor boat, likewise a good boat, well fitted and well finished, staunch and capable looking. This was a 16-footer equipped with a good, honest little two-cycle motor. It sold for $150. Thus it can be seen that the American manufacturer has prepared to supply the buyer's demand, whatever the state of his pocketbook may be.

As might have been expected, some of the exhibits reflected the present wide-spread tendency towards safety of life at sea. A striking exhibit was that of a lifeboat cruiser. She was designed as a craft which would include every factor of safety, a vessel which could live through any sea, which is fireproof, leakproof, self-righting and non-sinkable. All of this has been done with a boat only 36 feet long. The model is that of a motor lifeboat which has been adopted by the United States Life Saving Service for use on the coasts of the country. These boats have

been used for a number of years by life-saving corps for rescuing passengers of shipwrecked vessels. They are never used except under the very worst of conditions, which have brought distress to some sea-going vessel.

A portion of the exhibit of the Gray Motor Company at the 1914 show



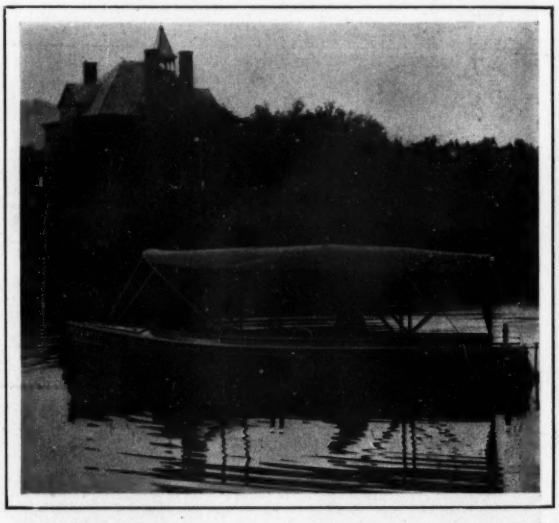
"Delph II," a 72-foot cruiser, luxuriously fitted and capable of 11 miles an hour

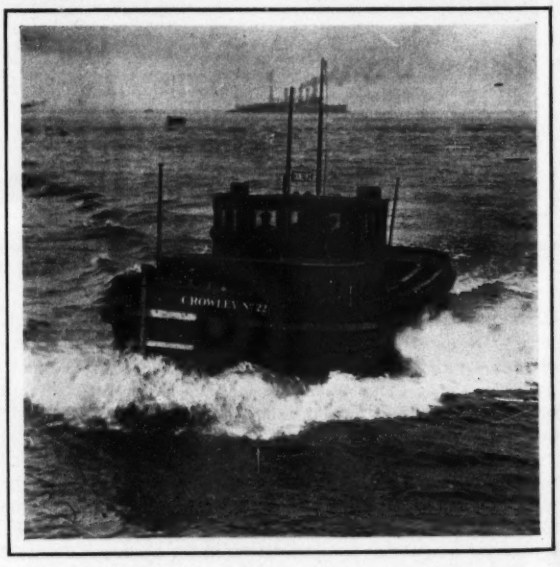
The builders of the lifeboat cruiser have taken this same model as a basis and without any radical change in the hull, have formed it into a comfortable cruiser. The boat shown bore the apt name "S. O. S." She was 33 feet 1 inch long on the waterline, 8 feet 6 inches beam, 2 feet 8 inches draft—a double-ended model with high freeboard forward and aft, with double decks high-crowned at the bow and stern. This design makes her uncapsizable, while her bulkheads are so arranged that they are entirely watertight, and the cockpit is self-bailing.

No matter how much water may come over this boat there is no danger of her foundering or capsizing. The construction is extremely strong and rigid, and every detail has been looked after with great care. The planking is double with a layer of heavy canvas, laid in waterproof marine glue, between the two thicknesses. The interior shows that no attempt has been made to cut up her quarters into small staterooms. It is left as one large open apartment containing all necessary conveniences. The boat is equipped with a four-cycle heavy-duty motor, 4½ inches bore by 6¼ inches stroke, and rated at 20 to 25 horsepower. This is a motor of the same model as used in the United States Government lifeboats. The installation of the power plant is an interesting matter. The engine-room is as nearly fireproof as is possible, with a cemented floor, and the sides are lined with copper for about 18 inches above the cement. The entire engine-room may be flushed out to remove all traces of oil or vapor.

There was another example of the "safety first" idea. This was a motor lifeboat designed for use aboard ocean vessels. The hull is 30 feet long, 10 feet beam, built of steel on the double hull system, and the design is far from conventional. She resembles very much the ancient Viking ships. It is said that she will accommodate sixty-five people with entire safety. An interesting feature of this boat is that upon each side there are heavy sponsons, or fenders. These are made of the famous *balsa* or raft wood of South America, which is lighter than cork, fairly strong in texture when coated with pitch, and impervious to water or dampness. These sponsons are held to the side of the boat by steel straps. Many tests have been made which prove that this lifeboat cannot be smashed when it is launched from the deck of a vessel. The Government made an extremely severe test. A boat of this type was lowered over the side of a vessel until it swung just clear of the water. A powerful tug, attached to the lifeboat by heavy lines, pulled her as far as possible from the side of the vessel. Then the lines were cut and the boat allowed to crash against the steel hull of the big ship. It was found

The "Notre Dame," a rift-climber type, now being used on Col. Roosevelt's South American Expedition



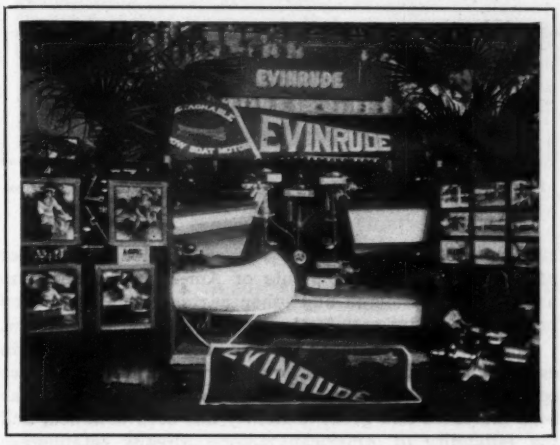


A tug boat driven by gasoline engines—note absence of the familiar smoke stack

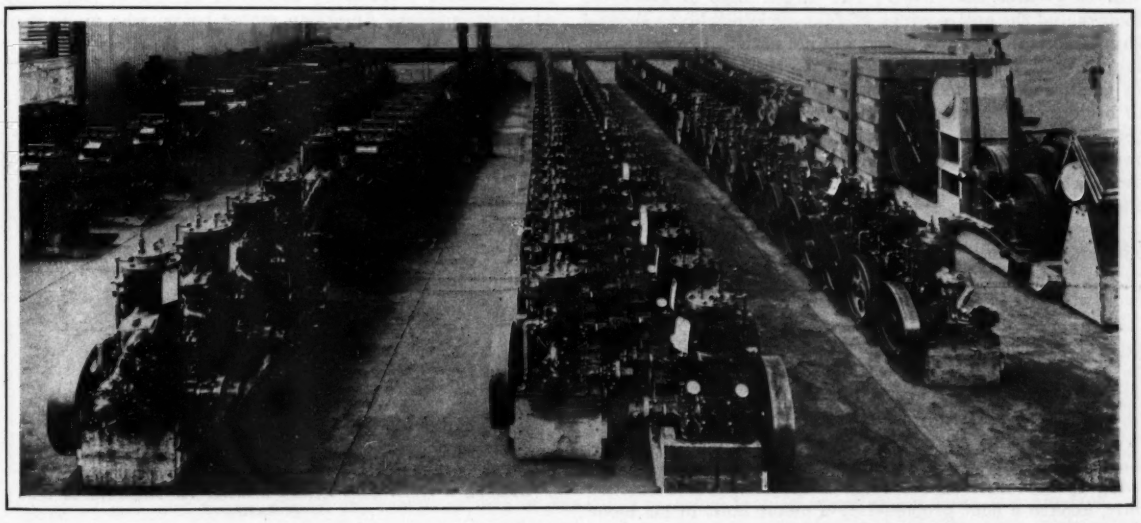
that the lifeboat suffered no damage of any kind. This boat is equipped with a 25-horsepower motor, has a compartment for storage of food and water and is equipped with a wireless outfit.

In this brief article it would be impossible to describe all of the boats. Of particular importance were a great many fine high-speed runabouts, splendidly built, hulls beautifully finished of polished hard woods, bright brass or nickel hardware, equipped with the finest of motors. Many American-built boats of this type are in use in all parts of the world and attract attention not only on account of their handsome appearance, but also by reason of the splendid service which they render. A boat originated in the United States some years ago and used everywhere, is known as the "Rift Climber" model. In this boat an extremely shallow draft has been obtained. The propeller turns in a sort of a tunnel or box-like arrangement, and the blades are entirely above the bottom of the boat. A boat of this kind can be run in a few inches of water and is capable of climbing rapids and running up shoal mountain streams without danger to the propelling equipment.

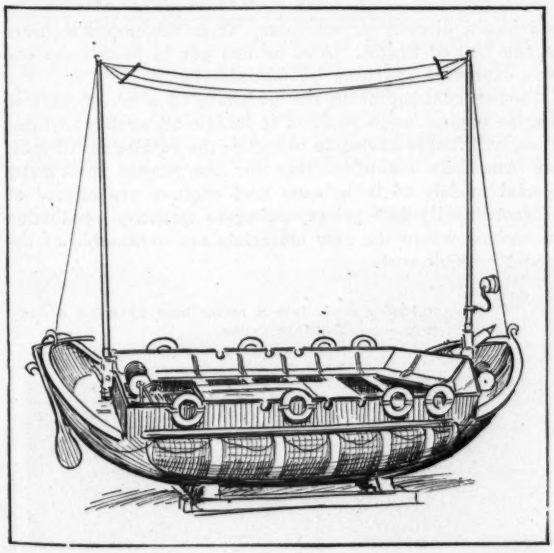
A corner of the display of Evinrude motors at the Motor Boat Show



Stock room of a marine motor factory—showing motors ready to ship as soon as ordered



This concern carries between 250 and 300 motors at all times, completely set up



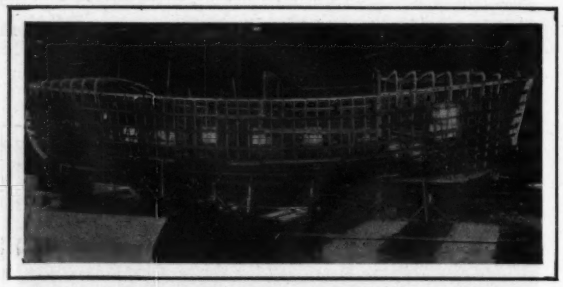
Courtesy of Motor Boat

Sketch of a new motor lifeboat for use aboard ocean steamers —cannot be smashed

Several of this type were selected by Colonel Roosevelt for use on his explorations on some of the little-known rivers of South America, in which work the Roosevelt expedition is now engaged.

Turning to the exhibits of marine motors, an impressive feature was the showing of Diesel type engines, of which four models of different makes were displayed. Among these was a six-cylinder, four-cycle, 200-horsepower motor, with cylinders 9½ inches bore by 11 inches stroke. There was also a two-cycle, four-cylinder motor, rated at 175-horsepower, with 9 inches bore and 12 inches stroke. Another of these fuel oil engines was a three-cylinder, four-cycle model rated at 50-horsepower, cylinders 8 inches bore by 9 inches stroke. The first American model Diesel motor was also represented; this was a six-cylinder, four-cycle type, cylinders 9 inches bore by 12½ inches stroke, rated at 180-horsepower. These Diesel motors all have particular interest for the foreign buyer, for to him a motor which is designed to operate upon the cheaper oils which are obtainable everywhere has especial attraction, particularly since gasoline is very high in price in some parts of the world and almost unobtainable in others.

In this connection another exhibit, that of a 36-horsepower motor attached to a Galusha producer gas outfit also proved interesting. Producer gas is obtained by means of a stove-like device, which extracts the gas from the coal. This gas, after passing through a washing or purifying process, is then used in the marine motor, which needs very little change from ordinary gasoline practice. It is said that this device represents the ultimate in economy and that it will operate as cheaply as would be pos-



Framework of a lifeboat cruiser during course of construction —is uncapsizable

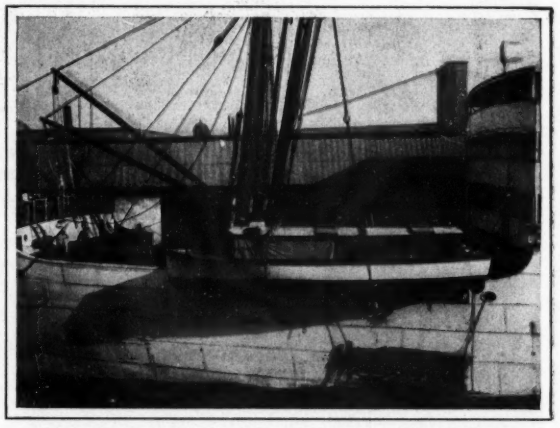
A 24-foot runabout with 20-35 h. p. engine capable of making 21 miles per hour

sible with liquid fuel at 3 or 4 cents a gallon. A number of producer gas power plants of American manufacture are in use in Holland and other parts of the world, and have given entire satisfaction in several years of service.

The motor exhibits showed marked improvement in every type. Two-cycle motors of small horsepower have been brought to a state of high refinement; economy has been increased and great flexibility has been obtained, and the reliability of American motors, already established, will be greater than ever. The larger sizes of two-cycle motors and the entire range of four-cycle machines showed that American manufacturers are not satisfied to rest upon laurels won, but continue to improve their product, mostly in smaller details to be true, but with the general result of betterment. Perhaps no portion of the American motor industry has found greater support abroad than that which represents a newer development, namely, the portable or detachable motors for use on rowboats, skiffs, canoes, etc. Four manufacturers specialized upon motors of this type at the recent Show, and each one of these proved to be efficient, ingenious and reliable motor equipment, one which can be depended upon to add to the prestige of its maker everywhere it is introduced.

Not long ago the writer had a talk with a tourist just returning from a trip around the world. He stated that he had had no idea of the importance of the American motor boat industry when he left home. But everywhere he went he found American boats and American motors in active service, used for pleasure or engaged in profitable, commercial work. He stated that it gave him a little thrill to be taken ashore from a vessel in some obscure part, aboard a boat propelled by a motor built in his home town and run by a native engineer who had had no schooling in mechanics, but who seemed to have little trouble in operating the machine. This gentleman added that in the fishing fleets of the north countries of Europe he found that a large number of American motors were used, and that they lead numerically and in combined power the products of all other countries. So, too, in far-off places like Australia and New Zealand, American boats and motors are looked upon as the best that can be had. In Japan he had a short trip in a native *sampan* equipped with a two-cylinder, two-cycle American motor that had been in use for several years. Upon the canals of Holland he found American motors towing barges, and even upon the lagoons of Venice, the romantic gondolier of days gone by is rapidly learning to use American-built marine motors.

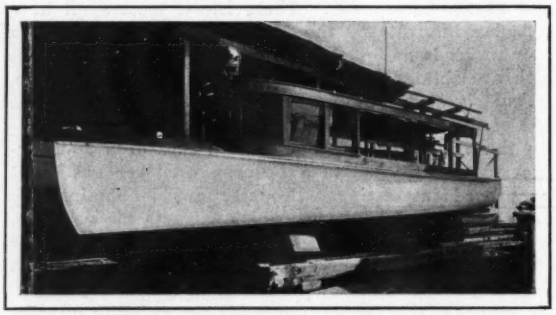
It is difficult for one to grasp, unless he has had an opportunity to travel around the world, as this gentleman did, the extent to which American motor boats and marine engines have already become established factors in international trade. The writer's correspondence, however, brings letters from every corner of the globe, from those who own and use American motor boats, who made their purchases, directly or indirectly, from the manufacturers in the United States. And he has yet to hear from one who expresses anything but satisfaction.



Hoisting a motor boat aboard steamer for shipment to the West Indies

Parties contemplating the purchase of a motor boat or marine engine, or in position to handle an agency in these lines, will find it advisable to secure the catalogues of leading American manufacturers for the reason that many special models of both boats and engines are offered at extraordinarily low prices, owing to quantity production in regions where the raw materials are obtainable at the lowest possible cost.

A small cabin cruiser, with 24 h. p. motor, about to be shipped to Tampico, Mexico



A "V" bottom tender made into a motor boat by using a detachable motor

Broadway in front of the Woolworth Building during the great storm of February 14, 1914

In the downtown commercial district, where thousands of trucks were stalled in the snow

REMOVING THE SNOW AFTER A BLIZZARD IN NEW YORK

An Army of Nearly 20,000 Men with 4,000 Carts and 8,000 Horses Required to Clear 2,000 Miles of Streets

IMAGINE a city street more than two thousand miles long. It would stretch about two-thirds the way across the continent of North America. Then let your fancy picture it nearly two feet deep in snow that has drifted and frozen. Six million people want it cleared in a hurry. It must be made passable for traffic with the least possible delay, for the daily life of these millions depends upon it—their food and fuel supplies, getting to and from their work, and a hundred other things that are locked in the grip of the ice and snow.

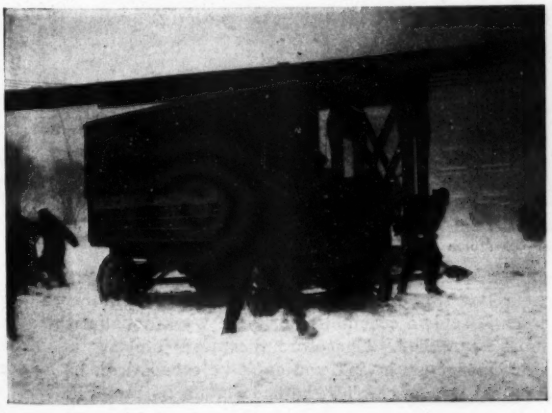
That is the problem that New York City had to face last February when one of the worst winter storms that it had known for several years descended and clogged the wheels of its activity. Such a storm quite equals a large conflagration in the extent of the damage that it inflicts on a great city. It temporarily paralyzes the entire life of a vast metropolis, compelling its millions of human units to lay aside mechanical aids and sit idle while—shovelful by shovelful and wagonload by wagonload—an army of men and horses attack the results of one of the elemental forces of nature which even this scientific age has found no other way of conquering.

To gather an adequate idea of the magnitude of this task a few figures are necessary. New York has 2,017 miles of city roadways which, under ordinary circumstances, are swept and cleaned every day. From these streets are gathered each year by the Department of Street Cleaning 350,000 tons of sweepings—the kind taken up with brooms and scrapers—2,500,000 tons of ashes, 350,000 tons of garbage, and 170,000 tons of light rubbish. When a big snowstorm comes practically all this work is interrupted until the streets are made passable for wagons. Ashes, garbage and other rubbish have to pile up. The street cleaning department devotes almost all its energies to removing the snow. As soon as it can get about with its carts it resumes its usual duties.

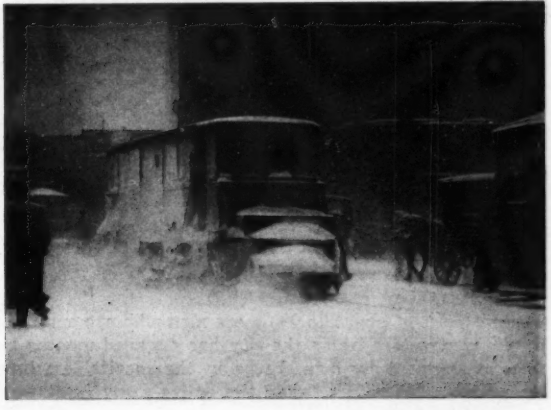
Of the more than two thousand miles of New York streets there are about five hundred that are classed as "principal thoroughfares." These are the great arteries of traffic. They must be cleaned first. On Manhattan Island they are the avenues that run north and south and the other streets a hundred feet in width that cross the island at intervals of every half mile. The narrower, less-traveled streets are left until later. If the weather is kind, the sun does a good deal of the work of snow removal there. Elsewhere, however, it is a question of working night and day.

For every inch of snowfall on these five hundred miles of streets it is estimated that 175,000 cubic yards of snow will have to be carted away. In the February blizzards the total depth of the snow was calculated at 17 inches. Very little of this melted, for during and after these storms the mecury remained far below freezing except at midday and beneath the sun's direct rays. Also the snow drifted badly, which made the task of its removal more difficult.

A huge mail truck stuck in the snow directly in front of the Post Office



A powerful electric sweeper sent out by the street railways to keep their tracks clear



Snow is the most dreaded enemy that the street cleaning department has to cope with. From the time winter sets in, the street cleaning commissioner scans the weather predictions closely. If he gets word of a blizzard moving

A squad from the Street Cleaning Department attacking the drifts in an East Side street

from the West, or from any other point of the compass, he begins mobilizing his forces so as to have them ready for instant use when the first flakes begin whirling down from the dark skies.

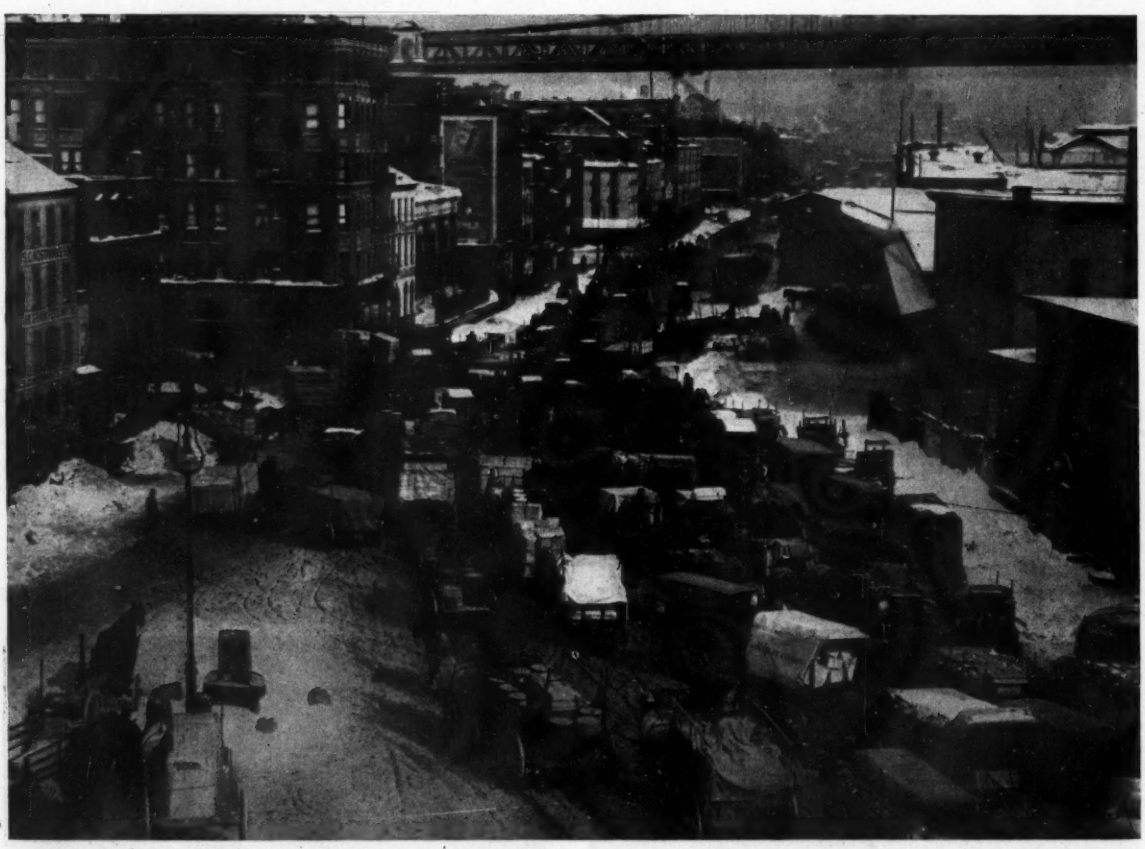
The army of regular street cleaners is nearly 7,000 strong. Of these about 5,000 are instantly available for the fight against the snow. Then come the "reserves." These consist of about 15,000 more men who are employed by the contractors whom the city has engaged months before to augment its own forces in the inevitable winter emergency. Therefore, when the entire army is at work it is nearly 20,000 shovels strong.

Every great city—and especially New York—is the gathering place of thousands of men who flock from all parts of the country when their summer's work is done. By the time of the first heavy snowfall, which usually does not come until after the first of January, many of these men have spent all their savings and are in need of work. Therefore, the task of snow removal, when it comes, finds an army waiting for it. The usual rate of pay in this temporary employment is twenty cents an hour.

When the contractors get word from the street cleaning department to begin operations, each knows in advance the points in his district where he must send his carts and men first. The city is mapped off into sections for the purpose of snow removal, and each contractor's bid is based on clearing the streets in the districts or sections which his agreement covers. The first thing when the carts arrive is for each of them to be measured by an inspector of the street cleaning department to determine the number of cubic yards it will hold. The result of this measurement is inscribed on a placard which is tacked o the side of the cart. Each driver carries a ticket. This is punched when the cart is loaded, and it is punched a second time when the load is dumped at the place appointed, to show that the work has been performed. This method has been found more satisfactory than the one in use some years ago when the cubic yardage was measured as the snow lay on the ground. Still other methods by which the cost of snow removal may be reduced, and the chances of dishonesty lessened, have been suggested, but none of them have been put into practice as yet.

Of course there are many elements of waste in a big work like this that has to be done in a great hurry. Rush work is seldom economical and the work done on the snow must be rushed. Therefore the motto the city adopts in this emergency is, "If you can't be economical, be as economical as you can." The snow must be removed.

In round figures, based on theory and years of experi-



Congestion of trucks near the ferries on South Street, giving some idea of the immense traffic that was temporarily paralyzed during and immediately after the storm

ence, snow removal costs New York City at the average rate of $50,000 an inch. It costs more when there is continued cold weather. Therefore, the seventeen inches that blanketed the metropolis last February entailed an expense of close to a million dollars before it was cleared away. This is about one-eighth the sum that is spent otherwise in keeping the city's streets clean for an entire year. The snow removal cost is such an uncertain item that it is not included in the regular departmental budget.

The contractors divide their forces into gangs of about 50 men each. To each gang 20 trucks are assigned. Their first work is to clear a path through the center of the street, so that wheeled traffic can move to and fro. The snow that is removed in this way could not be handled fast enough if it was loaded directly into the carts. Therefore it is tossed into a succession of big piles along the curb. There is an interval between each pile sufficient to allow delivery wagons of all sorts to be backed up to the sidewalk so that the regular business of handling the city's food, fuel and other supplies may not be unduly delayed or hindered. It is from these piles that the snow is shoveled into the carts and taken away.

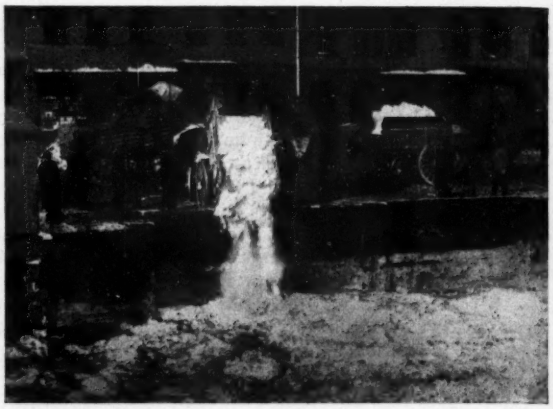
About 4,000 carts and twice that many horses are steadily employed while getting rid of New York's snow. The contractors are paid 56 cents for every cubic yard of snow removed from the streets of Manhattan Island, 41.9 cents in Brooklyn, and 42 cents in the Borough of the Bronx, which spreads out north of Manhattan, beyond the Harlem River. These snow removal contracts are usually let in the summer.

The prices allowed the contractors vary in Manhattan, Brooklyn and the Bronx for the reason that the average distances that the loads of snow have to be hauled before they are dumped into the rivers or the sewer openings are not the same. The rate is higher on Manhattan Island than elsewhere on that account. The island is between ten and eleven miles long and tapers to a point at its southern end where the Hudson and the East Rivers meet in the harbor. In its greatest width it is nearly six miles across. Another thing that makes the price of snow removal greater is the density of traffic on the streets. All these things—and many others of less weight—enter into the question.

The largest individual carriers in the work of snow removal were the motor trucks

In order to gauge the efficiency of the men employed to remove the snow a new plan was tried this year. An inspector of the street cleaning department went about with a photographer and took pictures all over the lower part of the city where the streets are narrowest and the congestion the worst. These photographs showed the gangs of men at work and the snow they had put in piles. Photographs were taken of the same snow piles after an interval of half an hour to show how fast the work was progressing.

The Street Cleaning Department and private contractors made quick work of clearing Fifth Avenue, as the long line of loaded trucks on each side of the street shows



As fast as the trucks were loaded they were driven to the nearest pier and the snow dumped into the harbor, where the next outgoing tide swept it out to sea

This new method of gauging the industry of the men was a disappointment in one respect. It was expected, before it was tried, that the pictures would show hundreds of gangs busily at work. Instead, when the plates were developed, it was found that the men in every gang were standing erect, resting on their shovels, facing the camera. It seems a natural instinct for a man to pose whenever he is having his picture taken.

In both Manhattan and Brooklyn part of the snow was removed by dumping it into the largest of the sewer mains, but this was found impractical in many parts of the city. Even where this method was employed, it could not be used except when the tide was low. The great rivers that embrace Manhattan Island are tidal streams. At high tide—and especially when the wind is blowing a gale from certain directions—the tide rises so high that it blocks the mouths of the sewers, impeding the outflow of the melting snow. Then, again, if the snow is packed hard and is mixed with sand it is likely to clog the sewers. To obviate this, in many districts, 2½-inch hose pipes are attached to the street hydrants and a steady flow of water is kept rushing into the sewer to wash away the obstructions. This is the method employed in some of the great cities of Europe where the snowfall is heavy.

Another reason for haste in the removal of snow from the streets of a great city like New York is the ever-present danger of fire. One of the first things done by the street cleaning department is to see that a space of ten feet is cleared away about every fire hydrant. The next is to see that the streets leading from the fire stations to the main thoroughfares are cleaned of snow, so that the apparatus may move quickly in answering an alarm. In New York City especially, when high winds and bitter cold accompany or follow a heavy fall of snow, the daily number of fires always shows a very considerable increase.

On account of its situation—its great business center being on an island surrounded by broad, swift-flowing rivers—New York City is more at the mercy of a heavy snowstorm than almost any other metropolis in the world. Practically all the city's food supply has to be transported across the Hudson from the great freight terminals of the railways on the New Jersey shore. A vast population has to be fed each day, and in winter the reserve supply of food is sufficient for less than a week. A long-continued storm interrupts water traffic primarily, and the hundreds of carloads of foodstuffs that have to be ferried over are late in arriving. Next, the streets being deep with snow, the vehicular transportation is impeded and sometimes brought to a standstill for a day. Thus the journey of the meat and milk and vegetables and bread from the car to the consumer becomes unusually long and tedious. It does not quicken to its natural gait until the streets are cleared of the snow.

The fuel problem, in the dead of winter, is another in which lies an element of danger when a snow tempest smothers the city. New York is famed the world over for its giant buildings—its skyscrapers downtown and its huge apartment houses in the residence section. So restricted

(*Continued on page 80*)

The only members of the community who really welcomed the snowfall were the youngsters.—Schoolboys snowballing one another in one of the public playgrounds of the city

The chief executive's private office is the nerve center of any large establishment, and here privacy should be combined with accessibility —at the left, executive office of R. G. Dun & Co., at the right, private room of the general manager

MODERNIZING THE BUSINESS OFFICE

Improved Arrangement, Better Light and Air, and Numberless Labor-Saving Devices Result in More Economical Operation and Greatly Increased Efficiency

By Thaddeus S. Dayton, New York

ACCORDING to the modern conception of business it is a learned profession. As such it is being taught in business schools and universities. The successful conduct of business has been greatly aided by mechanical inventions and by the new science of management. Large concerns were the first to avail themselves of these. They are equally efficient when applied to smaller enterprises.

Economy of time is as important in a business office as in a factory. Therefore the old-fashioned "counting house," where letters were copied by hand, is disappearing along with the methods of other days. In its place the office scientifically arranged and conducted has appeared. Every motion is made to count. Like an intricate machine on which much depends, it is watched constantly and closely. If there is any waste of energy it is remedied at once.

The private office of the head is the nerve center of the establishment—the middle ground between the public and the business—between the outsiders and the insiders. The office of the chief executive must be so situated as to serve all concerned to the best advantage. Privacy is a desirable requisite, but this office should be located where it can be reached conveniently. Its physical accessibility must depend on the class of business. In a mercantile establishment, for example, where it is necessary for the manager to keep in more or less close personal touch with his customers, his office may be placed close to the main entrance of the store.

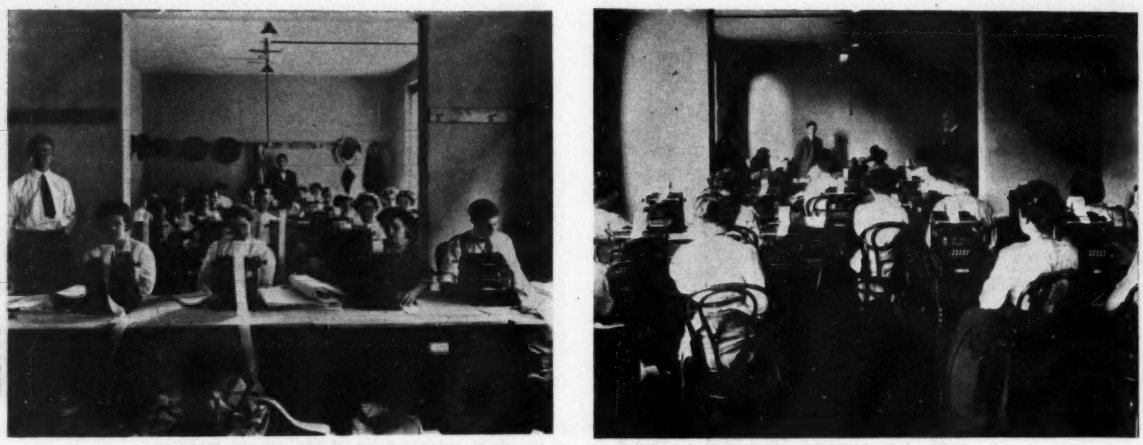
Then there may be private offices for subordinates. This also is governed by the character and size of the business. Who should have a private office, and why, is a question in practically every business of any size, and it is one that seldom is settled to the satisfaction of all.

In appearance the private office should carry out the general suggestion of the business of which it is a part, so that the visitor's confidence may be definitely strengthened when he enters. It must carry an air of practicability. Its arrangement and its furniture must be figured out from the primary standpoint of utility and efficiency.

The head of a concern, big or little, must keep his finger on every angle of the business. In a small business an intelligent stenographer can be trained so that much of the routine will be taken from the chief's shoulders and the essential details will reach him in condensed form. In fact the working out of any business system depends upon a capable force of assistants. It should be their duty to stop, so far as possible, the six big leaks by which the executive's time may be lost. These are: mail, visitors, telephone calls, reports, meetings and inspections. To a great extent to-day business is impersonal. Visitors and telephone calls may be cut down in various ways, and reports may be condensed.

One man who was trying to run a rapidly growing business without any executive assistance evolved this system of keeping his desk clear. Just outside his private office sits a young woman stenographer. A filing system

The private editorial rooms of the "Iron Age" (shown at the left) have glass partitions admitting daylight to the corridor; the Minneapolis mail order house, at right, is artificially lighted by Welsbach gas fixtures



Many of the clerks employed in compiling the 13th Census of the United States in the Census Bureau at Washington used adding machines, which greatly facilitated the vast amount of adding and tabulating that had to be done

takes care of the papers, and on her desk are card and "tickler" systems that direct every routine move of her chief.

When he comes into his office in the morning he is handed a pocket memorandum showing his engagements for the day. The papers that demand his immediate attention are laid before him and are removed as quickly as they are passed upon. Then he is given another list showing the office matters that must have his attention during the day. Ten minutes before the time he must leave to keep an appointment a reminder is laid on his desk. If he lingers beyond the designated minute he receives a verbal warning. As new matters arise that call for future attention, the stenographer takes down the substance. The card system on her desk absorbs it and insures that it will be taken care of at the right time.

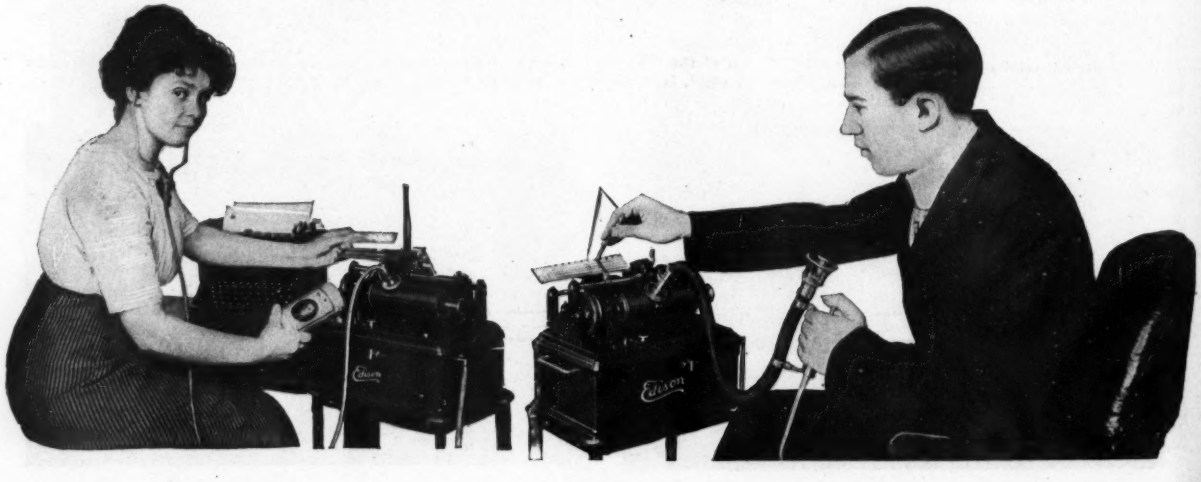
In laying out offices for the staff of any business a careful study of the floor space, with the idea of saving time, effort and expense, is necessary. It is not a question f how much equipment to put in, but rather how little can handle with ease and comfort the clerical work of each department. Another important study, which needs the experience of an expert as well as common sense, is the proper distribution of light. Often one finds a room with fine windows on two sides given over to salesmen's desks while the stenographers and clerks are crowded in a room not nearly so well lighted. Salesmen may be important as "producers," but they are away from their offices so much that light is less important to them than to the clerks who are there all the time and much of whose efficiency depends on the light they have to work by.

The old-fashioned "glass globe" system of artificial lighting is ornamental, but it wastes about 40 per cent. of the light. Where concentrated light is not required the "indirect" system is the best so far. The light is thrown upward to a white ceiling and is diffused throughout the room without casting shadows. Then there is the "unit" system in which single lights are suspended near the ceiling in such quantities as may be necessary. This is especially adapted to large offices with low ceilings. The "drop light" is now considered wasteful and costly.

Plenty of pure, fresh air is another requisite for office efficiency. To secure this is largely a matter of good judgment and experience. The use of electric fans, in winter as well as in summer, has become very general in business offices. Experience has shown that it is better to use two fans and run them at a lower speed than one fan at high speed. The latter makes noise and stirs up dust. Also sharp air currents are dangerous to most persons. The placing of the fans also is important. The air currents should be directed in general at the breathing line. When too high they do little good; when too low they stir up dust. It is best to keep one's head cooler than the feet. Other things being equal, the fans should be arranged to blow from the outside toward the inside walls and toward the air outlets rather than toward the air inlets.

The accounting department of a business is one of its most important clerical divisions. Various devices have been invented to lighten and make more accurate the labors of the bookkeeper. There are card ledgers, loose-leaf ledgers, card indexes, and so on. Their differences and advantages are so many that it would require a great deal

The dictating machine. With this device the letters are recorded on cylinders of soft wax, which are sent to the operator to be transcribed as soon as filled, thus saving all of the time and labor of taking down dictation in shorthand



The little device here shown on the manager's desk enables him to dictate direct to a stenographer in another room, or, by pressing a button, establish a connection so that he can converse with any subordinate, with whose 'phone this master station is connected

of space to describe them even briefly. The mechanical appliances, however, are fewer in number and their specific utilities in every business are more easily indicated.

Calculating machines have replaced mental labor to a great extent in the modern office. These devices add, subtract, multiply or divide. Some of them show the result on a register consisting of metal wheels with the Arabic numerals inscribed on their edges. These are visualized through a little window opposite the register. Others—especially the adding machines—have, in addition to this, an attachment that prints the result on a paper slip or ticket together with the figures from which it is obtained.

Some of these machines are operated by hand, numbered keys being pressed successively. In others electricity is used, a small motor supplying the power for effecting the mechanical movement. The electricity may be obtained through a flexible cord from the nearest electric light socket. All the operator has to do is to set the keys by a simple pressure and then turn on the power. This power is stored in a coiled spring, which is automatically wound by the motor every four revolutions of the main cylinder of the machine.

To solve mechanically a mathematical problem with a calculating machine is remarkably easy. There is a primary and a secondary keyboard. If two numbers are to be multiplied they are set down by the machine by pressing the proper figures in each keyboard. A touch is given to the operating lever, the computing cylinder begins to revolve, and in a few seconds the result is shown in a line of figures at the back of the machine. As a check against any possible errors on the part of the operator, a "proof meter" at the left shows the multiplier that has been used, and a proof of the multiplicand is seen on the primary keyboard where the figures that have been depressed remain down until the machine is cleared. All the mental work of every calculation is done by the motions of the mechanism.

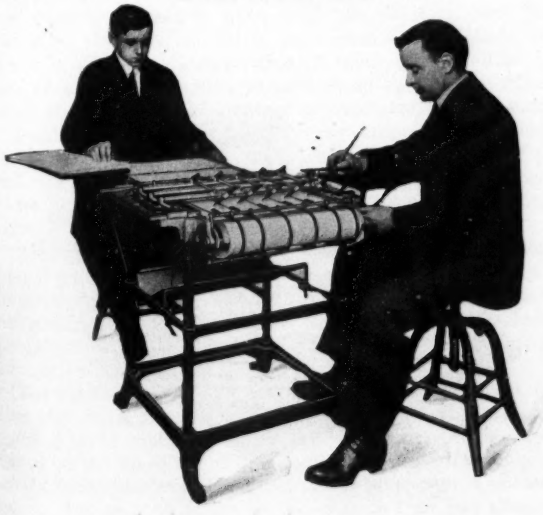
These machines are great time savers, compared with mental effort. In addition to their speed they are absolutely accurate and no time has to be spent in checking their results.

The principle of the adding mechanism also has been applied to the typewriter. Both the typewriting and the calculating are imprinted on the same line on the same piece of paper in plain sight of the operator, thus combining the advantages of the best separate machines of each class. This sort of machine is especially advantageous in making out statements of debts and credits. The ledger page and the names of the accounts are written by touching the typewriter keys. The amounts are set down in their proper columns by the calculating keys. Then a lever is moved and the adding mechanism prints the total at the foot of each column.

This machine also is used in preparing cost sheets where there are many columns. The rows of figures are added both horizontally and vertically. Discounts may also be reckoned, amounts may be subtracted from each other, and so on, making a wide range of commercial work possible.

The telephone, as a means of intercommunication in offices, lacks privacy and secrecy; also words or figures may be misunderstood. These drawbacks are overcome

Banks and large corporations often use this apparatus, which signs ten checks simultaneously



A larger type makes 18 signatures on bonds, stocks, bills of exchange, form letters, etc.

Typist transcribing letters from another type of dictating machine, shown at right

With this machine a boy can address 3,000 letters an hour, the work of 20 hand operators

by means of another electric device, the telautograph, which may be better described as a pen-writing telegraph. It delivers a written message instantaneously in facsimile. The writer holds a pencil in the usual way, but in writing, currents of electricity are set in action which actuate a receiving pen at the other end. If the person to whom the message is sent is absent when it is transmitted, he finds it there on his return. The work of the telautograph is not interfered with by noise, which makes it especially useful in transmitting messages from the office to the workrooms of factories, etc.

In making up payrolls in the office, change-making machines are employed. A key is pressed for each transaction, and no mental calculation is necessary. It is practicable only for metallic currency, however. If 98 cents is wanted, the keys representing that amount are touched, as in the calculating machines, and the minimum number of coins for that amount drop into the pay envelope. In actually making change, pressing another set of keys causes the machine to deliver the difference between the amount pressed and 100. If the figures 76 are depressed, two dimes and four pennies come out.

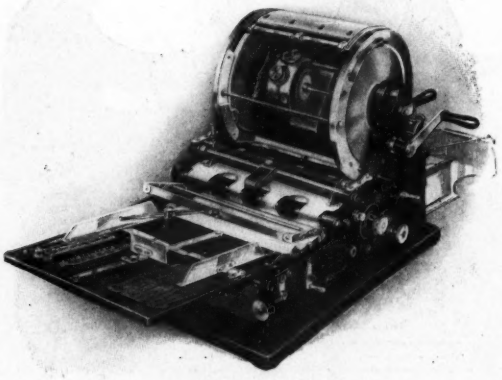
The typewriting machine is so familiar to everyone that a description of its functions would be superfluous. There are several devices, however, that are attached to typewriters for various purposes. In many offices a record of the number of words written by each operator is kept as the measure of their actual accomplishment. An automatic word-counter is attached to the machine. This is operated by the space bar of the typewriter and registers the number of words written up to any moment. Some of these devices register every 180 depressions of the keys. This appliance, among other things, furnishes an absolutely accurate check on the efficiency of the individual typist.

An electrical device eliminates the stenographer's notebook. This machine is in two forms. One is the cylinder-record phonograph of the familiar type; the other is on the same principle, but somewhat different in its mechanism. Stenographers—even the best of them—lose time both in taking their notes and deciphering them. The high-priced executive loses time waiting for the stenographer. With this apparatus all this is eliminated. The typist can start or stop the record at any point by pressing a button with her foot. There is a printed memo. system in connection with the scale on the machine by means of which the dictator may make corrections or insert afterthoughts. When the wax cylinder has served its purpose, a thin coating is shaved off by an auxiliary machine, and it can be used over and over again. Business men whose time is too much occupied for letter writing during the day can dictate all night to the phonograph, if they wish, without feeling that anyone is working overtime but themselves.

The dictograph is the first cousin of the phonograph and the telephone. The dictograph's wires may radiate from the manager's desk to every department. He presses one button after another and can check up, from what he hears, what is going on at each desk almost as well as if he were there. It is also used in many other ways. A man sits alone in his private office and dictates to a stenog-

Ten visible adding and listing machines in the office of the U. S. National Bank of Omaha

A rotary machine with automatic feed capable of reproducing 100 form letters per minute



rapher a hundred or more feet away. No one else hears what is said. The dictator does not talk into a mouthpiece, like a telephone transmitter. He may get up and walk about the room while talking, but the person at the other end will hear every word distinctly. Its great advantage is the ease with which it places the chief and his subordinates in instant communication without any of them leaving their desks.

A computing machine using a standard typewriter keyboard and electrically operated

Form letters play an important part in every business. They are not used entirely in soliciting orders or in following up prospects. They may be employed quite as effectively in answering correspondence. In almost any business a limited number of form letters will answer nine-tenths of the inquiries. The head of a department runs through his mail and instead of dictating replies jots down the number of the form letter on each sheet, together with any added word that may be necessary. There are many different methods of duplicating this class of correspondence.

Ventilation is important in every crowded office and electric fans, by keeping employees comfortable in hot weather, add much to efficiency of an office force

There are devices for printing with printer's ink which will turn out almost anything that can be done in a small job office. Letters that have every appearance of having been written on the typewriter may be turned out by the thousand at a great saving in time. The average stenographer, working steadily, cannot do more than 150 letters a day. In the same time she can fill in the names and addresses on about a thousand letters. One of these type duplicators has an attachment which permits of addressing the letter as it is printed, thus insuring an absolute ribbon match.

Duplicate letters, with good, strong selling ideas in them, are a powerful means of advancing any business. It is not the physical appearance of the form letter that gives it away. It is what it contains that causes it to be consigned to the wastebasket.

Among other duplicating processes are the clay process and the gelatin or hektograph. Each of these has been so long in use that they hardly need description. They are especially advantageous when a large sheet on which there are a number of pen-written figures must be reproduced twenty or thirty times.

The old-fashioned copying press has been pushed out of the way to a great extent of late years. The modern method is to make carbon copies of letters as they are typed on the machine. These copies are filed with the rest of the correspondence from and to the same person or concern. The only objection to this plan is that pen corrections made on the original letter may be inadvertently omitted from the carbon. This is overcome by running the original letters through a machine in which the dampened tissue paper to receive the impression is in the form of a roll. The tissue is automatically cut to the size of the letter sheet as it emerges from the machine. Some of these devices are worked by hand, and some by electricity. Either way they are much quicker than the old-fashioned copying press.

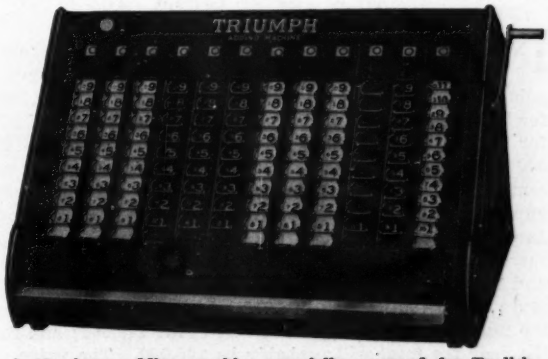
The sealing of envelopes and the affixing of stamps also are done mechanically. There are both hand power and machine power devices for this purpose. With a machine as many as 6,000 letters an hour can be sealed and stamped. A counter records the number of stamps used.

While the handling of incoming mail does not offer such opportunities for time saving, there is a chance for economy in this direction where the volume of letters is large. A knife or an abrasive wheel or belt takes off just enough from the end of the envelope to open it.

For the busy business head who has to sign his name hundreds of times a day to letters, checks, stock certificates, bonds and other papers, a machine has been invented also. It is called the "signagraph." The person whose signature is to be reproduced uses what is called a "monitor pen," that is attached to mechanism which moves ten or eighteen other pens similarly and simultaneously. The sheets of paper are arranged one above the other. As fast as each set is signed a button is touched and steel fingers take them away. With an 18-pen machine the record is 5,000 signatures in 28 minutes, although that number an hour is considered fast enough for all ordinary purposes.

In offices that cover considerable floor space the messenger is practically done away with to-day. He is replaced by parcel carriers, like those in use in department stores, and by pneumatic tubes. Devices of this sort save many miles of walking and years of time in the course of a month, even in an establishment of moderate size.

Another device that saves a large amount of time in offices where a great deal of mail matter has to be addressed over and over to the same names—as, for example, the mailing lists of publications, the list of policy holders of insurance companies, etc.—is a machine capable of printing addresses on envelopes or wrappers at a speed as high as 3,000 per hour.



A 12-column adding machine especially arranged for English currency and decimals

REMOVING THE SNOW AT NEW YORK

(*Continued from page 74*)

is the space available for fuel storage in most of these gigantic structures that they must have coal every day or two or else their tenants will begin to shiver.

In the period of these February blizzards, this year, the city suffered less than usual, although the hardships of the streets were greater. A considerable portion of the thousands of tons of coal consumed daily is now hauled by great automobile trucks. With snow nearly two feet deep in the streets—a condition never before encountered by these machines in New York—they had to lighten their loads, but they were able to plow through the drifts and make their deliveries successfully.

A part of the work of street cleaning in snow time is done usually by the surface lines of tramways. Some of these are overhead trolleys; others—on Manhattan Island—have the trolley connection underground between the tracks. These latter suffered the worst in the unprecedented fall of snow last winter. The underground conduit became blocked with snow, and for several days many of the important lines were halted entirely. Those lines that had storage battery cars employed them to good advantage.

Usually when a snowstorm begins the tramways send their mechanical sweepers at short intervals over their lines as long as the snow continues. On this recent occasion, however, the snow fell so densely and was accompanied by such a gale, which at times reached a velocity of more than a hundred miles an hour, that it was physically impossible to keep the tracks clear.

One line, about twelve miles in length, kept thirty of its power sweepers in operation continuously for more than twenty-four hours. At the crossings and switches men were stationed with brooms in an effort to keep the shunting points from being clogged, but all this did not avail, finally, in the face of the fierce storm that was raging.

But despite its discomforts, there is nothing so picturesque as a vast city deep in fresh snow. Even the homeless, hopeless drifters whom the lodging houses sent out to join the army of shovelers laughed and joked at their work. Within a little while after the snow ceased falling a high wind swept the heavens clear and the sun glittered coldly from a cloudless sky. Then, one by one, up the harbor came a fleet of half a hundred great steamers that had been tossing to and fro on the storm-whipped ocean outside of Sandy Hook, waiting until the blinding gale and driving sleet should cease. Each of these vessels was a mass of glittering ice and snow. As they came to their respective piers their thousands of passengers and vast quantities of freight contributed materially to the congestion of street traffic caused by the great storm.

GROWTH IN USE OF MOTOR CARS

IN the State of New York, which forms one of the most remarkable territories in the world from the standpoint of automobiles used, the total net receipts from fees for licenses and registration certificates reached $1,275,000 for the last ten months of 1913, as compared with $1,060,000 in 1912 and $905,000 in 1911, according to figures recently tabulated by the Secretary of the State, to whom applications for licenses and certificates are made. From January to approximately the middle of December, 1913, there were registered 133,000 owners, 57,000 chauffeurs and 1,800 dealers, as against 105,000 owners, 45,000 chauffeurs and 1,700 dealers in 1912. By the end of January the number of cars registered was about 149,000; and for the year the total will probably be 165,000. The value of automobiles in New York averages slightly over $1,000.

In the State of Massachusetts, another territory in which motor cars of all varieties abound, the official figures show a gain of 25 per cent. in the amount of business transacted during 1913 over that of 1912. The sum of $764,000 was collected from fees and 62,660 machines were registered.

TWO TRADE TOURS OF CENTRAL AMERICA

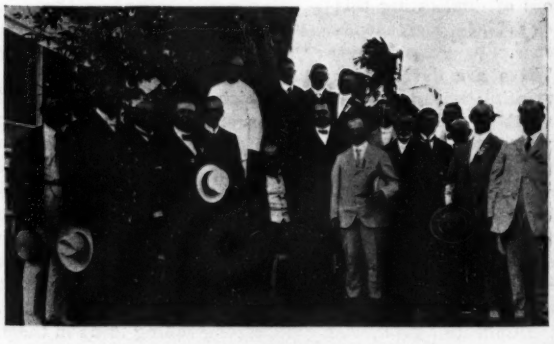
Business Men of Mobile, Ala., and Galveston, Tex., Study the Latin-American Markets at First Hand

IN view of the fact that two or three notable trade tours in other lands are at present being made by parties of American business men, while several others are in course of preparation, it may be of interest to recall a few of the facts relating to two very successful trade tours that took place last year. One of these was organized and carried out under the auspices of the Chamber of Commerce and Business League of Mobile, Alabama, and was called

The Mobile Trade Commission on board the S. S. Belize on its way to Central America

the Trade Commission of Mobile. The other was organized by the Galveston Commercial Association, and both had the same object in view—the study of the nearby markets of Central America.

The Trade Commission of Mobile consisted of representatives of a number of the leading business houses of that city. The secretary of the Commission was Mr. Gerrard Harris, of the *Mobile Register* and also a special commercial agent of the United States Department of Commerce. The party sailed on the steamship *Belize* of the Orr-Laubenheimer Steamship Line on the 16th of May, more than a thousand persons coming to the pier to see them off. The first stop of the Commission was at Belize, British Honduras, where it was welcomed by a deputation



The Governor of British Honduras (seated) and guests after the luncheon to the Commission

of prominent citizens and received by the Governor of the Colony, Wilfred Collett, who entertained the party at a luncheon given in their honor. The business men of the city also entertained the visiting delegates, who were given an opportunity to see the city and become personally acquainted with its leading merchants.

The Commission then sailed for Guatemala, where the first stop made was at Livingston, at the mouth of the Rio Dulce. From this point the party proceeded to Puerto Barrios, where it took the train for Guatemala City. Here the party was officially received by President Cabrera and

(*Concluded on page 89*)

THE FIFTH PAN-AMERICAN CONFERENCE

General Outline of the Program that will be Considered by the Delegates at Santiago de Chile Next Year

By Waldon Fawcett, Washington, D. C.

PLANS are rapidly taking form for the Fifth International Conference of the American Republics to be held at Santiago, Chile, in September, 1914, under the auspices of the Pan-American Union. It is manifest from the subjects selected for discussion that the gathering in Chile will have considerable influence upon trade interests throughout the western hemisphere.

In this respect the forthcoming gathering will not be different from its four predecessors held respectively in the United States, Mexico, Brazil and Argentina. At each of these gatherings resolutions were passed, or other action taken, with reference to commercial relations between the various countries of North, South and Central America; and many reforms that have proven of great benefit to the interests engaged in international trade were carried out by the Governments of the 21 republics on the initiative and upon the recommendation of these periodic congresses of New World nations.

The preparations for the forthcoming conference have been entrusted to two special committees— the Committee on Program and the Committee on Regulations—each of which has held a number of meetings. The Committee on Program consists of Secretary of State William Jennings Bryan of the United States, Senhor Domicio da Gama of Brazil, Señor Don Joaquin Bernardo Calvo of Costa Rica, Señor Don Pedro Ezequiel Rojas of Venezuela, Señor Don Romulo S. Naon of the Argentine Republic, Señor Don Eduardo Suarez Mujica of Chile, Señor Don Federico Alfonso Pezet of Peru, Señor Don Francisco Duenas of Salvador and Señor Don Manuel de la Vega-Calderon of Cuba.

Eleven general subjects are listed for debate and discussion at the Conference, according to the official program lately completed. First comes consideration of the application in each country of the conventions and resolutions of the Fourth Pan-American Conference; second is the review of the results accomplished by the Congress of Jurists which met in Rio de Janeiro with respect to the codification of international law; third, the definite organization of the Bureau of American Republics; fourth, planning for the solemnization of the opening of the Panama Canal and, fifth, measures designed to prevent the propagation of diseases.

Board Room of the Pan-American Union where the meetings of the committees preparing for the Conference have been held

Sixth on the list of subjects for discussion is the possibility of signing conventions based on the resolutions adopted by the International Sanitary Conferences of the American Republics. This will be followed by analysis and consideration of the conventions and resolutions adopted by the former conferences. Number eight on the program relates to the co-operation of the governments belonging to the Union in the construction of the Pan-American Railway. Next, the interchange of university professors and students will claim attention, to be followed by the adoption of measures for the repression of anarchism in the countries of the Pan-American Union. Finally will come a discussion as to whether or not it shall be declared a principle of American policy that aliens do not enjoy civil rights nor other recourses than those guaranteed by the constitution and laws of each country to the citizens thereof.

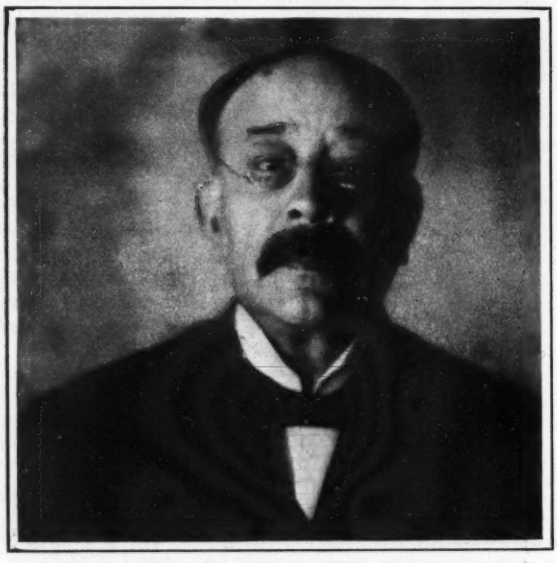
Señor Don Joaquin Bernardo Calvo, Minister from Costa Rica, Secretary of the Committee on Program

Regulations for the government of the forthcoming Conference have been prepared by the special committee, of which Señor Don Ignacio Calderon, of Bolivia, is chairman, and copies of these regulations are now being dispatched to all quarters of the three Americas by Secretary Francisco J. Yánes of the Governing Board of the Pan-American Union. It has been planned that the Minister of Foreign Affairs of the Republic of Chile shall preside at the opening session of the gathering in the capacity of temporary president. The permanent president will be elected by ballot of the delegates present. Inasmuch as the Government of Chile will provide a corps of clerks, secretaries, interpreters and other employés for the Conference, it is planned that the Secretary-general will be a delegate chosen by the President of Chile. He will be the intermediary between all the delegates and the Chilean authorities.

In deciding the questions that will come before the Conference the delegation of each of the 21 republics will have but one vote. The votes will be taken separately by countries, and the Conference will not proceed to vote on any resolution or motion relating to any of the subjects on the above program unless at least two-thirds of the nations attending the Conference are represented by delegates.

Delegates to the Conference will speak, each in his own language, and immediately upon the termination of any speech the interpreters will be prepared to render orally a synopsis of the principal points of the speech in the other

languages of the continent. The deliberations of the Conference will not necessarily be confined to the subjects listed on the formal program, inasmuch as any new subject may be brought up for discussion if two-thirds of the delegations are willing. It has been under this plan that there have been brought up at former conferences some of the most important matters affecting trade interests which have ever received attention at these gatherings. The duration of the Conference cannot be predicted in advance,



Señor Don Ignacio Calderon, Minister from Bolivia, Chairman of the Committee on Regulations

but the meetings will not, in any event, continue beyond November 10th, and the deliberations will probably be concluded several weeks earlier.

It is the expectation that at this Conference, as in the case of its forerunners, many of the delegates will be men of large financial and business interests, and the private interchange of ideas, for which opportunity will be afforded during the stay at Santiago, cannot fail to redound to the advantage of international trade movements in general, particularly by reason of the fact that this gathering takes place on the eve of the opening of the Panama Canal and in a quarter of the globe which will benefit to a greater extent perhaps than any other by reason of the new trade routes that the completion of the interoceanic waterway will make possible.

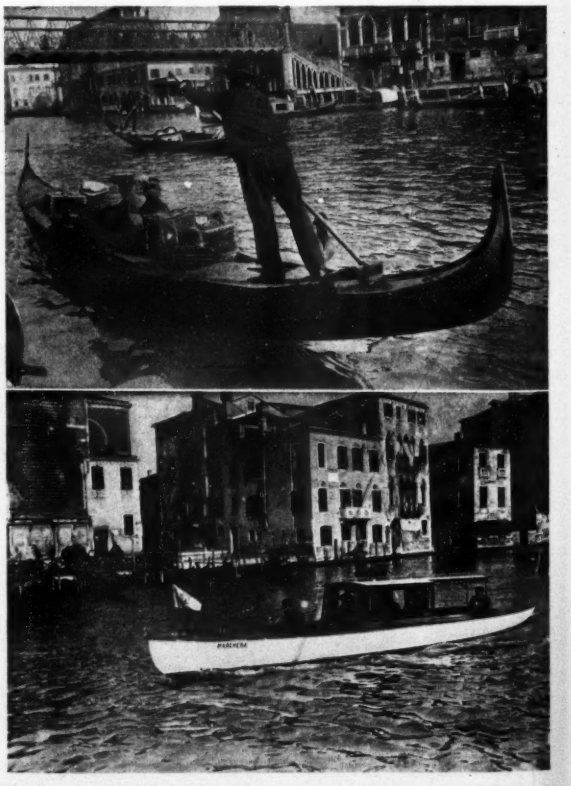
TWO NEW APPLICATIONS OF THE TELEPHONE

THERE is hardly any field of inventive activity in which greater progress has been made during the last decade than that of the telephone. Improvements connected with this invaluable instrument have followed one another so rapidly that it is almost impossible for the average man to keep track of them, save in so far as they relate to the types of instruments that are in every day use. One in particular is a modified telephone which is extremely sensitive, not requiring the user to hold a receiver to his ear or approach close to a transmitter. Speaking in an ordinary tone of voice to the instrument, which may be a foot or so away on the desk, the conversation is carried to the desired point and there the second instrument repeats it with considerable increase in volume. Thus, if two persons are consulting some items in their books, each can talk to the other without losing sight of the page, or a simultaneous conversation can be carried on with several persons situated at another point or at several points, facilitating consultations and business meetings, where distance intervenes. This apparatus practically brings all the conferees into one room, as it were, and gives almost all the benefits of a face to face talk, with this advantage —any instrument can be shut off, or by using an ear-piece made inaudible except to one person. The benefits in commercial life are manifest. The banker can discuss matters of credit with a customer and his bookkeeper who may be in a distant part of the building, or a superintendent can confer with his foremen, with a saving of time and at considerable convenience.

One of the most novel applications of the telephone has been in the form of an extremely sensitive transmitter and receiver for overhearing conversations in detective and police work. The transmitter is compact in size and can be hidden under a table, behind a picture frame, placed among the lighting fixtures or in any other position where it will not attract attention. It is connected by small wires to a set of electric cells and a telephone receiver located in another room. In this manner the conversation—even if only in whispers—can be heard in the receiver and copied down by a stenographer without the knowledge of the speakers. This apparatus has been employed in numerous instances for the securing of evidence against suspected criminals and is without doubt the most dramatic employment of the telephone.

POWER BOATS REPLACING THE GONDOLA

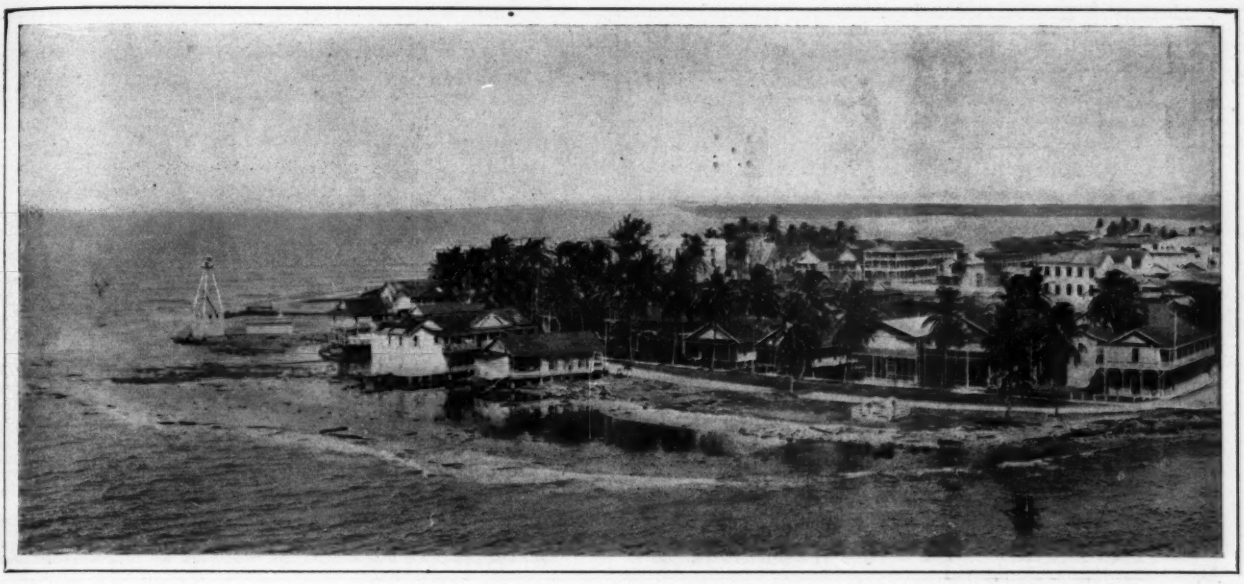
THOSE who still think of Venice as the water-avenued, far-famed city of the Middle Ages, with its winding canals, its gilded sea-palaces, its splendid architecture, its many sculptors and painters, its low-hanging bridges, its



The famous gondolas of Venice, so dear to tourists, are giving way to the speedier motor boats

landing places and, above all, its gondolas, are destined some day to receive a rude shock.

Venice has bowed to time. The water, the bridges and part of the architecture are there, but, most deplorable to relate, the gondolas are going. At least, they have been threatened with extinction. One of the accompanying photographs shows a modern power launch parting the waters of a Venetian roadway at a speed far outstripping that of the old craft. A number of boats of this type have been procured as substitutes for the gondolas.

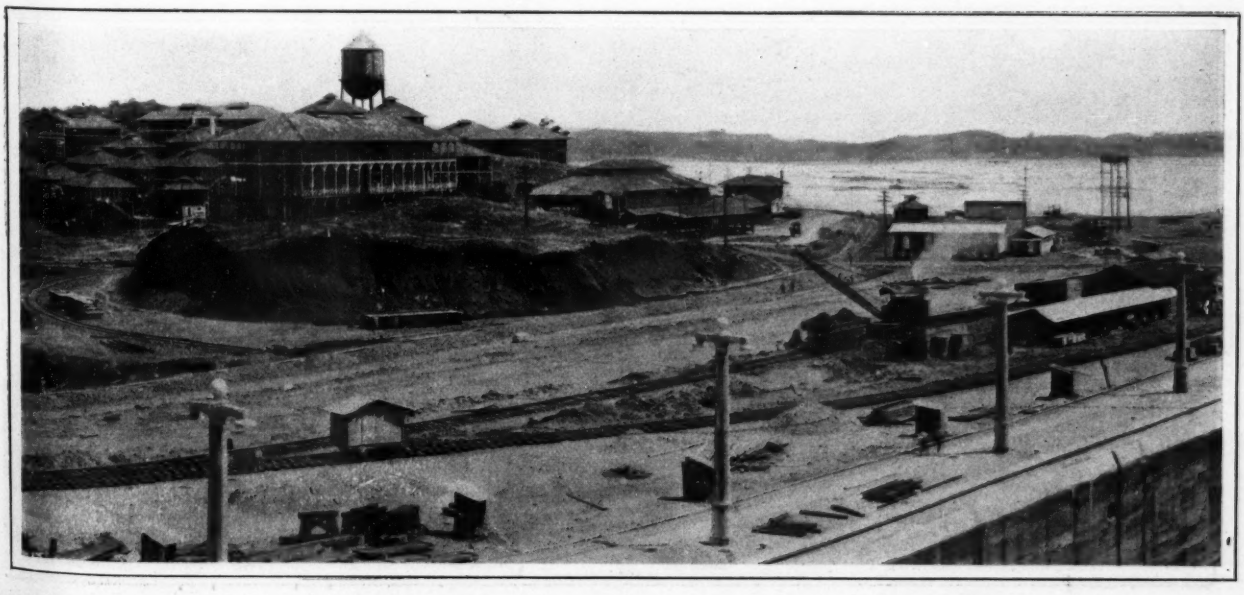


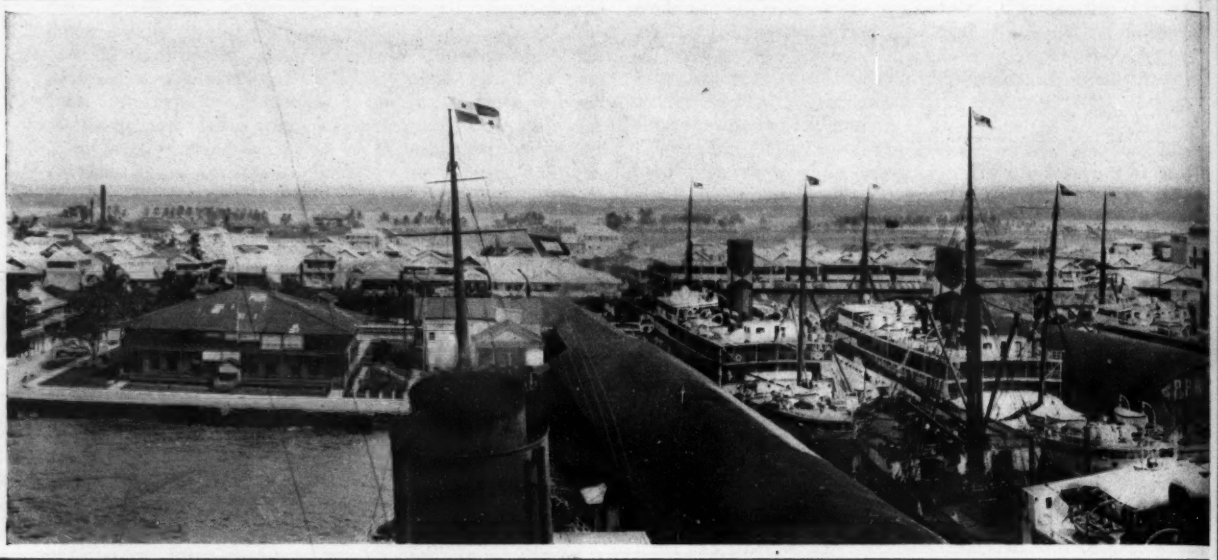
PROGRESS AT PANAMA

THE announcement by Col. Goethals on his recent visit to New York and Washington that the Panama Canal would, in all probability, be sufficiently completed to allow steamships to pass through it by July 1 brings the end of the long period of construction very near. The appointment of the great engineer to be the first Governor of the Canal Zone renders it certain that the same policies that have brought this vast undertaking to a successful conclusion will also prevail during the period of its initial operation.

The illustrations on this and the two following pages show, on the one hand, a portion of the great constructive work at Panama that is nearing completion and, on the other, a part of the project that is only just begun. The lower panels show the huge locks at Gatun, the three pictures forming sections of what in realty is a single view. The portion at the foot of this page shows the little city built by the Isthmian Canal Commission for the employees. The two remaining portions show one of the great locks nearly closed, while a fleet of tugs is making its way into Gatun Lake through the other. At the top of this page is shown the town of Cristobal, the residential quarter for the Americans at Colón, while at the top of pages 84 and 85 is a continuation of the same view showing the present steamship piers at Colón.

In a few more weeks the clutter of tool houses, workmen's sheds, etc., that give the locks an unfinished appearance will disappear, the tracks used by the dirt trains will be taken away, and this portion of the work will be done. On the great terminal ports at Colón and Balboa, on the other hand, the construction work is still in its earlier stages, and while these will appear small tasks to the builders of the canal itself there will be a marked transformation as they are completed. An era of building seems to have begun at both the terminal cities, but particularly at Panama, which—in addition to being the more attractive for tourists— is also the capital of the republic. Electric street rail-



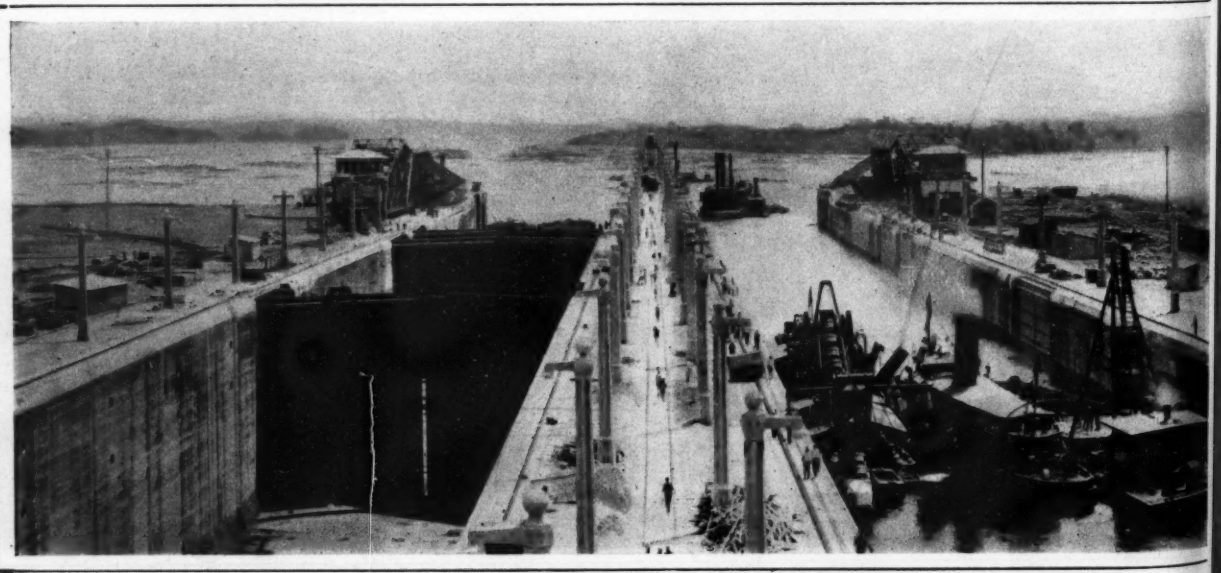


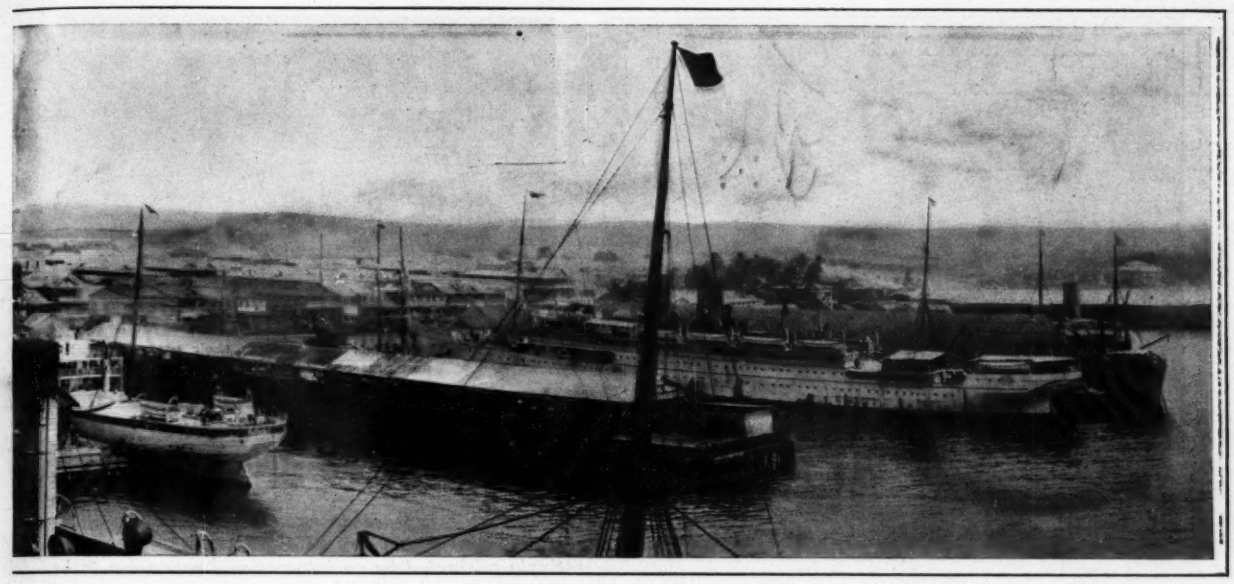
ways recently completed in both cities have brought outlying sections nearer to the business center, with the result that much real estate is changing hands, and many new and well constructed residences are being erected.

The tremendous battle against the slides at Culebra Cut has been the leading feature of the constructive work at Panama for the last six months. Over 250 acres of ground, aggregating more than thirty million cubic yards of material, have, since the work began, slipped into the cut as fast as the engineers with their army of powerful steam shovels and long dirt trains cleaned it out. This surplus material—to which the early estimates regarding the canal made no reference at all—required a million and a half big Lidgerwood cars to carry it away, or a train 12,000 miles long! The last slide at Cucaracha decided Col. Goethals to turn in the water and give the gigantic dredges that had been working at the ocean ends of the canal a chance to tackle the job. Thus far they have proved abundantly able to cope with it and, while it is not hoped that the slides will entirely cease, it is believed that the weight of the water in the canal will tend to hold the slipping earth in place and that the dredges will be able to keep up with whatever may come in from time to time.

Until the water was admitted to Culebra Cut and the dredges brought to bear upon the gigantic task of coping with the slides it seemed, for a time, as if the engineers were waging a losing battle against this unforeseen obstacle. Prior to 1910 the cut had not reached a sufficient depth to rende them very serious—only 7.87 per cent. of the total excavation up to that date being due to their activity. In 1910 the extra excavation caused by the slides amounted to 14.83 per cent. of the total, in 1911 to 26.3 per cent., and in 1912 to 46 per cent. At the beginning of the present fiscal year, July 1, 1913, two months' work would have reached the final bottom throughout the entire length of the cut, so that 44 weeks' work out of the 52—assuming that everything is finished July 1, 1914—will have been occasioned by the slides. Altogether, this factor has delayed the completion of the canal about 22 months.

It is a remarkable evidence of the executive and engineering ability of Col. Goethals and the late Col. Gaillard that, in spite of the unprecedented nature of the task, they were able to reduce the unit cost of removing a yard of soil from the cut steadily year by year as the battle with the slides went on. In 1908 this cost was estimated at 98 cents per yard, in 1909 this was reduced to 78 2-3 cents, then to 73 5-8 and to 63 3-8, and finally—in 1912—to 54 3-8



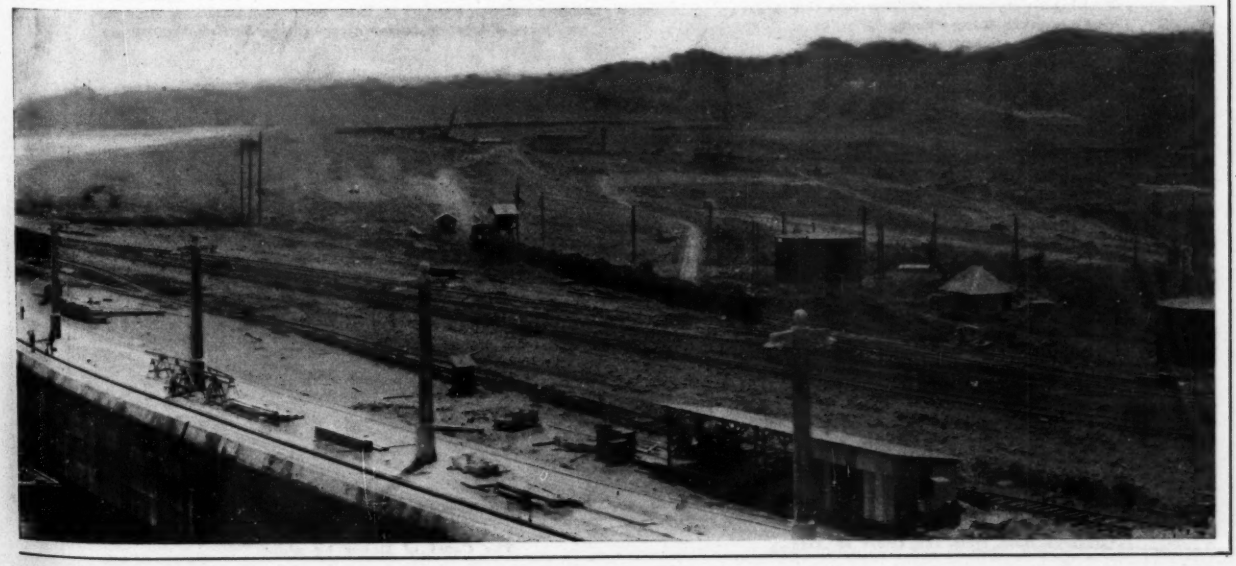


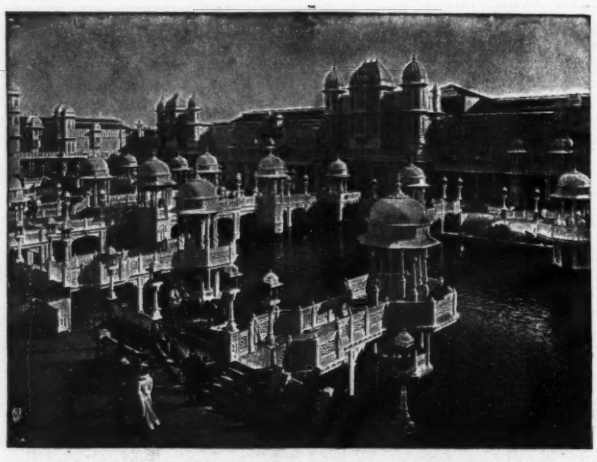
cents. As Mr. Showalter remarks in the "National Geographic Magazine" for February: "Than this, there is no prouder showing in the history of business economy or of engineering."

Apart from the tremendous engineering difficulties involved, the now historic slides have given Nature's final answer to the long controversy as to whether a lock or a sea-level canal should be constructed at Panama. The steadily increasing ratio of delay and extra excavation caused by the slides as the canal builders approached the final bottom of the present canal prism shows conclusively that if the canal had been 85 feet deeper even the vast army of laborers and the array of costly machinery assembled by the United States Government would have been utterly inadequate to cope with the task. When this became obvious the huge sums expended on tidal locks at Gamboa and Sosa, and in doing other things needful to a sea-level canal, would have had to be charged off to "experience" and the plans drawn all over again for a lock canal after all. Even in the hour of victory there would then have been the humiliation of a partial defeat. Happily, the far-sighted men responsible for the inauguration of the great work thought the problem out and arrived at what everyone now can see was the correct conclusion.

Another fortunate decision was the great enlargement of the canal prism and the locks over the sizes originally proposed by the French. Had the French canal been completed it would have been utterly inadequate to-day, for many of the boats that are known to be planning to use the Panama route could not have used it. The present locks are 1,000 feet long for each compartment. This is 50 feet longer than the "Vaterland," now building, so that the canal can easily accommodate the largest ships in the world. It is not likely, however, that the gigantic trans-Atlantic liners will ever use this route, although winter tourist steamers of 20,000 or 30,000 tons will undoubtedly do so.

*Before he returned to the isthmus from his recent visit to the Capital, Col. Goethals was presented with a gold medal by the National Geographic Society. The presentation speech was made by the President of the United States, who paid this tribute to the canal builder: "We have therefore to honor to-night the greatest living representative of his extraordinary profession. * * * The Government of the United States lent him to the world and he has done this thing for the world. For it is our proud boast that we have cut this highway for all the sea-going ships of the world."*



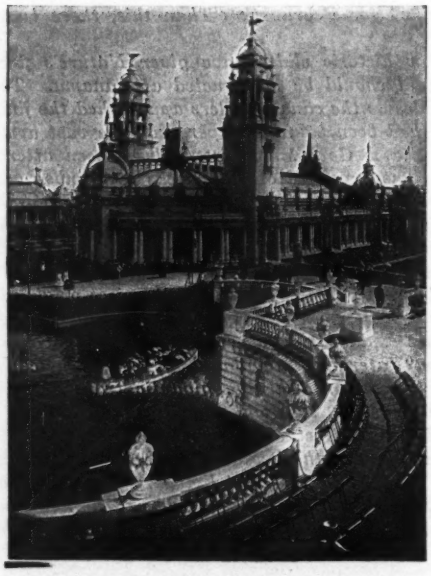


Court of Honor and American Textile Building. Textiles will naturally be one of the most important of the twenty-two groups into which the many exhibits will be divided

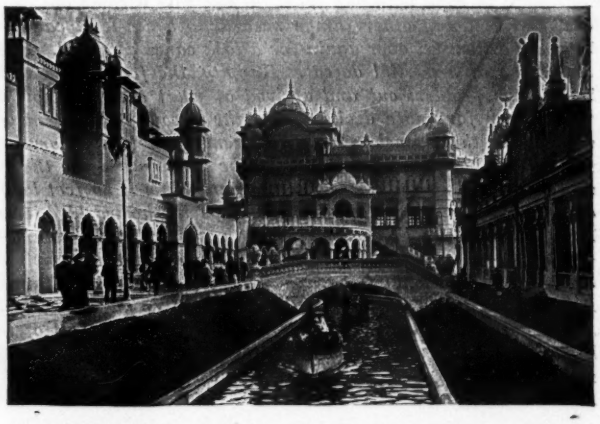
Exhibition Palace for foodstuffs and beverages, where equipment and methods employed in their preparation and preservation will be shown

THE ANGLO-AMERICAN

THE century of peace between the English-speaking nations since the Treaty of Ghent in 1814, is to be fittingly celebrated by an international exposition to be held at Shepherd's Bush, London, from May to October of the present year. This exposition will exemplify the progress in arts, sciences and industries in the United States and throughout the British Empire during this period. The exposition grounds cover about 150 acres and the buildings, many of which are permanent, are most admirably designed for their purpose.

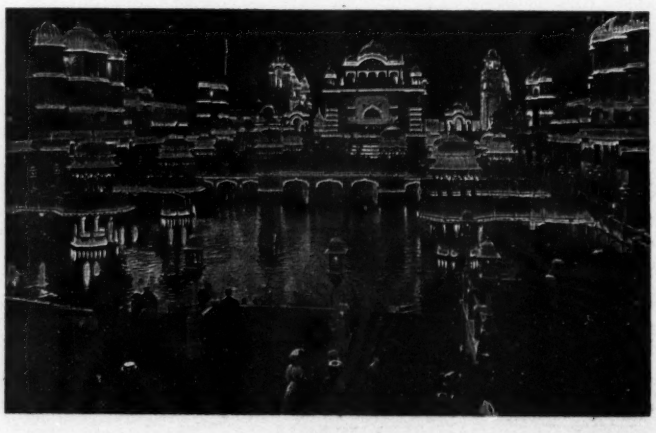


Applied Arts Building. There will also be a splendidly equipped fine arts palace, containing 30 galleries for paintings in addition to a central Sculpture Hall, which will be devoted to a collection of American and British modern art



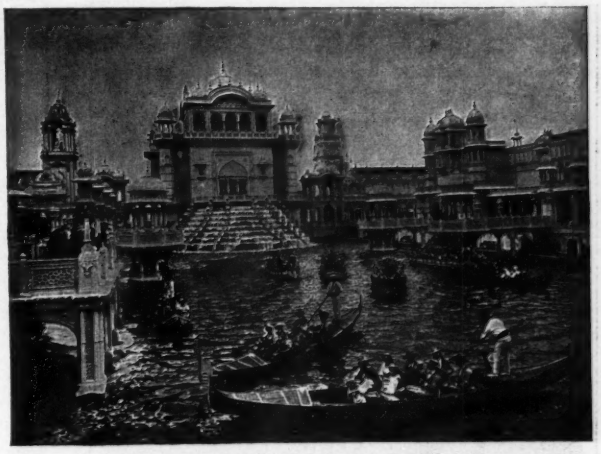
Congress Hall. Situated in the center of the exposition grounds, this building will be devoted to Congresses and Conferences on subjects of interest to America and the British Empire

Congress Hall, from the Court of Arts



The Court of Honor by night

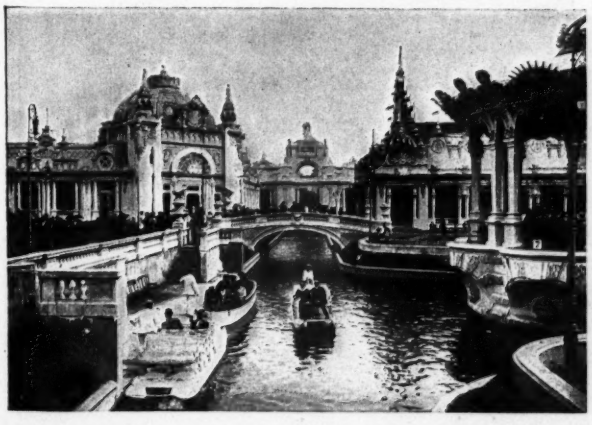
Hall of sports and physical culture. Within the exhibition grounds is the largest stadium in the world, and a fine running and cycle track



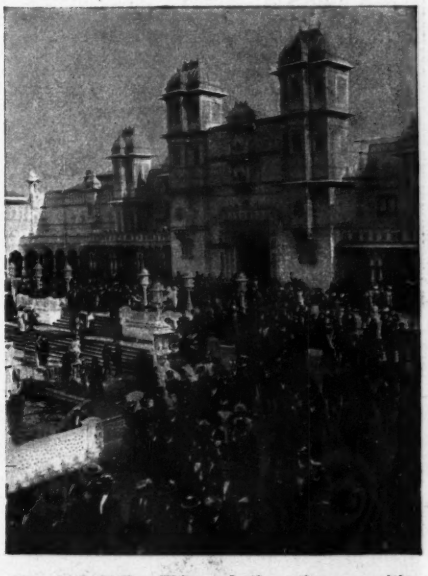
Another view of the Court of Honor, which forms the central feature of the exposition grounds, its lagoon being connected with canals that make the scene resemble a modern Venice

EXPOSITION, 1914

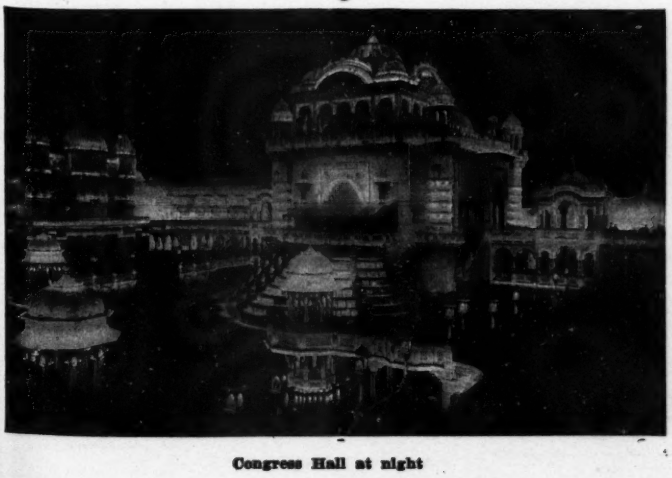
THE exposition has been organized under the patronage of H. R. H., the Duke of Connaught, and with a most distinguished list of officials, both English and American. Large and influential meetings have been held on both sides of the Atlantic to promote the enterprise the success of which seems to be completely assured. The accompanying illustrations, published by courtesy of the American executive officers of the exposition, Woolworth Building, New York, will give an excellent idea as to its immense size and artistic beauty.



Fine Arts Building. This has been pronounced to be the largest and the best equipped building of its kind in Europe, and it is believed its exhibits will be of extraordinary interest



Historical Hall. This and the other exposition buildings will be entirely fireproof, constructed of steel and concrete and containing altogether more than 1,000,000 sq. ft. of floor space. About 20 acres will be devoted to minor buildings



Congress Hall at night

Agriculture and Horticulture Building

THE GREAT VOLCANIC ERUPTION IN JAPAN

The accompanying illustrations give a most vivid conception of the appalling eruption that recently overwhelmed Sakurashima Island in Japan. The city of Kagoshima, situated across a strait from the scene of the disaster, was partially destroyed, but fortunately the loss of life was comparatively small.

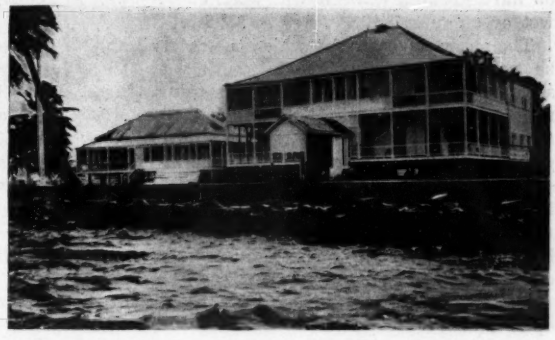
Upper photo courtesy N. Y. Times.

(Other photos by Paul Thompson.)

TWO TRADE TOURS OF CENTRAL AMERICA

(*Continued from page 80*)

was given much valuable assistance by the United States Consul General, George A. Bucklin, Jr. The stay at the capital of Guatemala was of sufficient duration to enable



Government House, Belize, British Honduras, where the delegates were officially entertained

the delegates to procure much valuable information regarding business methods and trade prospects in that country.

The itinerary arranged gave the Commission only a portion of a day at Puerto Cortez, Honduras, and did not touch Nicaragua at all, the delegates proceeding directly from Puerto Cortez to Port Limón, Costa Rica. Here they again left the coast, going by rail to San José, the capital, where the party was entertained by President Jimenez. Ample opportunity was given to study business conditions in this enterprising and interesting Republic. The last country visited was Panama, where the delegates visited the cities of Panama and Colón, returning from the latter port direct to Mobile.

The Secretary of the Commission prepared a very interesting report of 40 pages, embodying the observations made by the delegates in the different countries visited, and containing much valuable information, not only for the manufacturers and exporters at Mobile, but for those in other parts of the United States as well. This report was published by the Chamber of Commerce and Business League of Mobile. Several photographs were taken in British Honduras, some of which are reproduced herewith.

The other trade excursion to Central America referred to in the introduction to this article was organized by the Galveston Commercial Association and left that port June 14. The party visited the Republics of Guatemala, Honduras and Costa Rica, while Mr. H. H. Haines, the Traffic Manager and Acting Secretary of the excursion, also visited a portion of the Republic of Panama. The itinerary of the trip included Puerto Barrios, Guatemala City, Puerto Cortez, Port Limón and San José; while the Secretary also visited Bocas del Toro, Colón and Panama City.

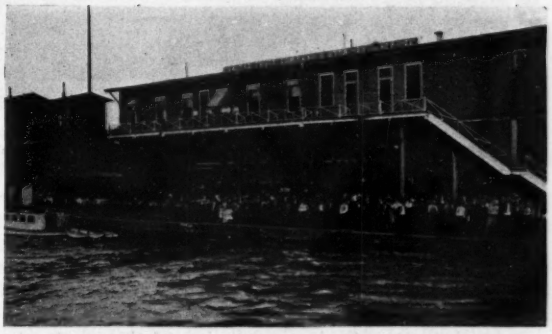
The Secretary made a brief but interesting report to the Commercial Association on the results of the tour and pointed out a number of lines in which the export trade of Galveston to Central America could probably be increased. This port already enjoys a very considerable trade with Latin-America and with the West Indies, as the following table, prepared by the Secretary of the Galveston Commercial Association, shows:

TRADE BETWEEN GALVESTON AND LATIN-AMERICA AND THE WEST INDIES, IN THE FISCAL YEAR 1912-1913

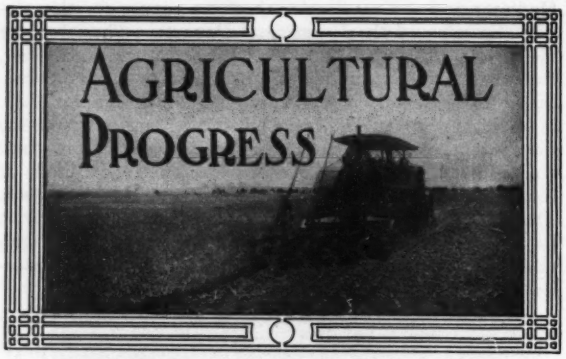
Country—	Exports	Imports	Total
Costa Rica	$56,645	$278,069	$334,714
Panama	25,969	290,682	316,651
Mexico	1,638,515	2,508,159	4,146,674
Cuba	1,595,857	1,223,665	2,819,522
Brazil	92,204	16	92,220
Guatemala	4,900	.....	4,900
Honduras	1,519	.....	1,519
Jamaica	129,935	.....	129,935
Trinidad	10,580	.....	10,580
Hayti	6,426	.....	6,426
San Domingo	2,893	.....	2,893
Chile	.....	387,537	387,537
Porto Rico	1,046,520	85,000	1,131,520
Total	$4,611,963	$4,773,128	$9,385,091

As the foregoing brief account shows, both of these tours were eminently successful in making the business men of the two American cities concerned better acquainted with their Central American neighbors and giving them a more complete realization of the manner in which trade with these important and nearby markets can best be developed. The tour also helped to make the merchants and importers of the various countries visited better acquainted with the exporters of Galveston and Mobile.

The city of Belize, British Honduras, as it appears from the deck of an approaching steamer. Although low, this city of 10,000 inhabitants is one of the most healthful in the tropics



Crowd at the United Fruit Company's pier at Belize, to see the Commission off



A TRACTOR WITH ORIGINAL FEATURES

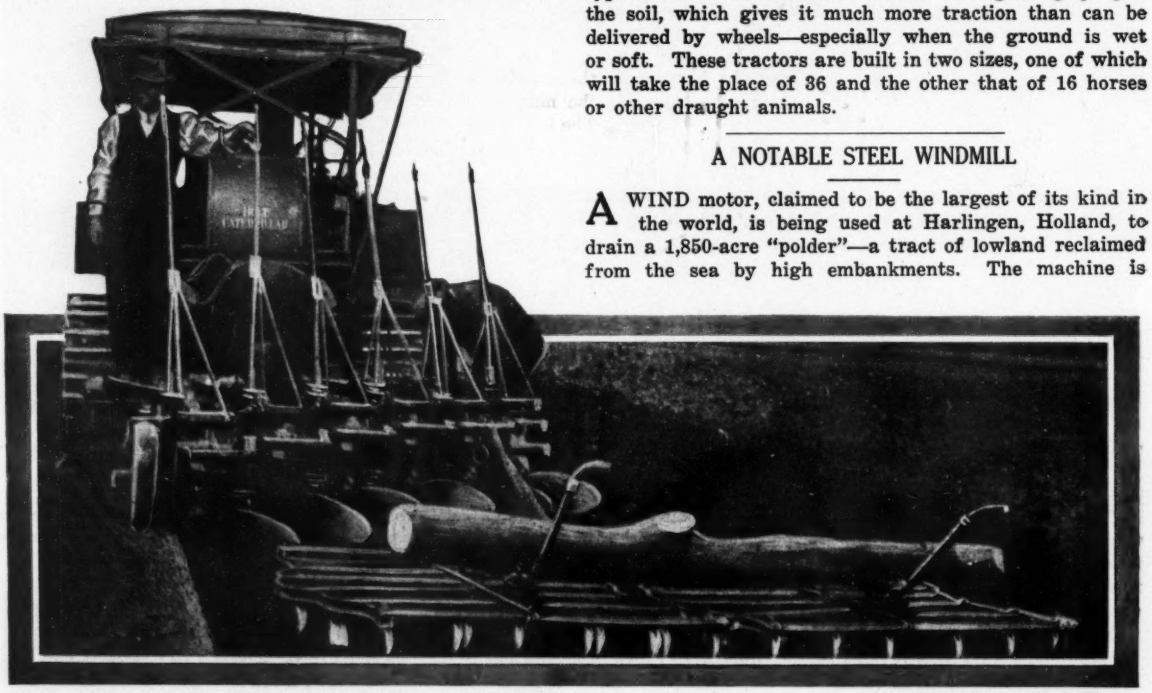
Owing to Its Peculiar Construction the Type Shown in the Illustration has Very Great Tractive Power

TRACTION engines are to-day familiar sights on the up-to-date farm in almost every part of the world, and their use is justified by the saving they effect in practically every class of agricultural labor for which power can be employed. These engines are divided into two great classes, steam and internal combustion, and both have their enthusiastic advocates, which is natural, as under varying circumstances each has a number of advantages to recommend it. The latter, however, using either oil or gasoline for fuel, of late years seems to be growing in favor, and, while it possesses certain limitations, the chief points in its favor are its lightness in weight, simplicity in operation, and the fact that it carries its own fuel, needs no water supply and can be cared for by one man.

For a long time the general design of the gas tractor, aside from the engine itself, has followed that of the machine operated by steam, but what is known as the "Caterpillar" tractor forms a type that is decidedly original and distinctly different from all others. As may be seen in the accompanying illustration, the caterpillar does not run on wheels, in the ordinary acceptance of that term, but instead is provided with its own steel track, which might be termed self-laying and lifting. Owing to this system the traction is greater than can be obtained by any other means, so that there can be no slipping, either in soft or on hard ground, while it will work equally well in sandy, wet or stony soils.

The many purposes for which the caterpillar tractor can be used successfully include rooting up trees, pulling stumps, plowing, harrowing, harvesting, threshing and running a saw mill, or if desired it can be attached to a number of wagons, which it will haul over any kind of ground, even or uneven. In fact, one of the great merits of this machine is that it appears to make little difference how rough the surface of the ground may be, as it has no wheels to sink in and the track upon which it runs enables it to cross ruts and hollows of considerable width and depth or to surmount small ridges and hills.

Mr. Vincent Astor, some time since, needed a tractor upon his experimental farm at Rhinebeck, N. Y., and purchased the Caterpillar shown in the accompanying illustration. A contractor who had to clear over 8,000 acres of trees and stumps for the great New York City reservoir site bought two of these machines and reported that they did the work with satisfaction and dispatch. The president of the United Railways of San Francisco, it may be added, recently bought 22 for use in developing a 100,000-acre tract at Suisun. The superiority of the caterpillar type of tractor is claimed to be due to its great grip upon the soil, which gives it much more traction than can be delivered by wheels—especially when the ground is wet or soft. These tractors are built in two sizes, one of which will take the place of 36 and the other that of 16 horses or other draught animals.



Courtesy New York Times.

One of the new "Caterpillar" gas tractors at work on Vincent Astor's experimental farm at Rhinebeck, N. Y. It does the work of 36 horses, hauling six 14-inch disc plows, a tooth harrow, a cutaway disc and a three-section roller

A NOTABLE STEEL WINDMILL

A WIND motor, claimed to be the largest of its kind in the world, is being used at Harlingen, Holland, to drain a 1,850-acre "polder"—a tract of lowland reclaimed from the sea by high embankments. The machine is mounted on a steel tower, is supplied with steel sails, measures 50 feet in diameter, and is said to be capable of handling 64,000 to 70,000 cubic feet of water per hour. The old wooden windmills formerly in use were first succeeded by explosion motors, which were in turn succeeded by the present steel wind motors for draining polders. Due to the fact that Holland is the oldest windmill country in the world, this adoption of what is distinctly an American system of windmill, is interesting. For more than half a century American manufacturers have been specializing on steel tower windmills, with steel fans and gearing complete, and this type has proved successful in practically every part of the world.

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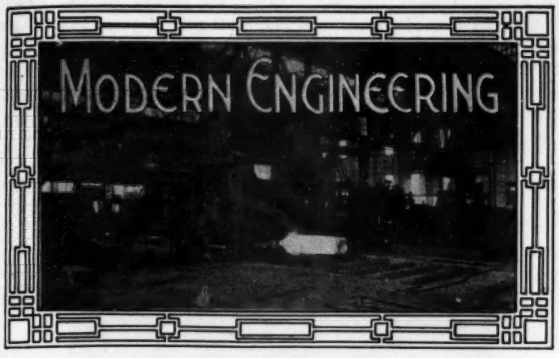


GASOLINE MOTOR CARS FOR RAILWAYS

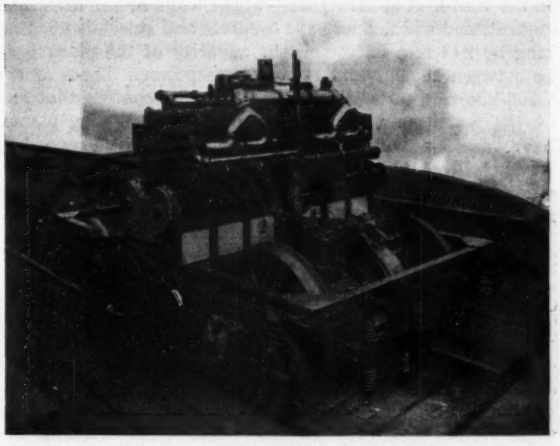
Gasoline is Replacing Steam on Branch Lines of Several American Railroads

THE gasoline motor is rapidly making a place for itself on railroads, as it has on the water and on the highways. There are many American railroads to-day using gasoline motor cars on their spur lines where the volume of traffic is not sufficient to warrant the running of steam locomotives and heavy trains because of the high expense involved. For this service the gasoline motor car is a practical solution, since the operating expenses are, in comparison, quite moderate.

The two accompanying illustrations represent the power plant and complete view of one of the gasoline motor cars recently built and delivered to two American railroads. Each gasoline car comprises three main units—the car body, the power plant and the mechanical transmission system.

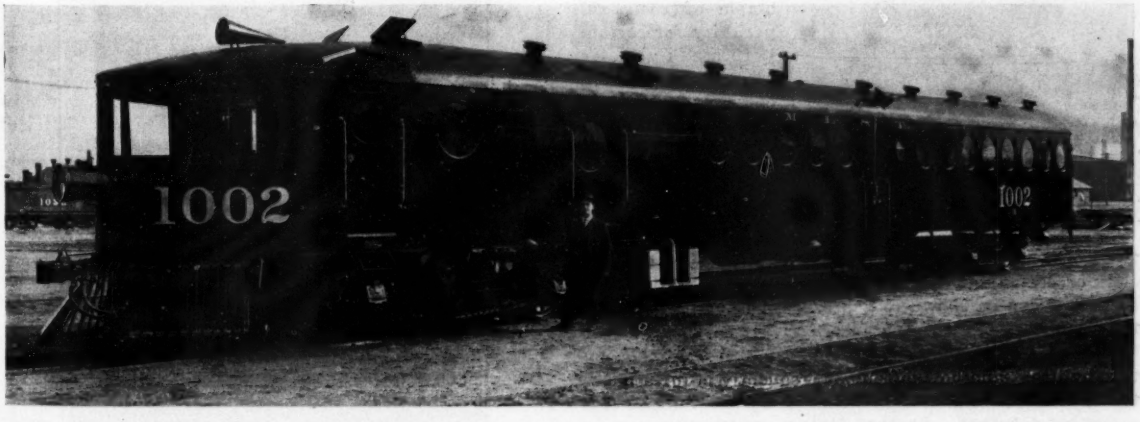
The car body is of attractive design, with a wedge-shaped front and a rounded rear end. The car is 70 feet long and is divided into three main sections—the baggage compartment, smoking compartment and the passenger compartment; the two latter compartments having a seating capacity of 29 and 54 passengers, respectively. In the wedge-shaped front of the car are situated the gasoline engine and the controls for the motorman. The door for the passengers is located in the center. The complete car weighs 74,000 pounds, is 10 feet 2¾ inches wide and 11 feet 9¼ inches high.

The gasoline engine is entirely enclosed and designed to insure the minimum derangement of the various parts. The machinery is self-lubricated and operates automatically as far as practicable, the aim of the builders being to eliminate almost entirely the necessity of frequent attention on the part of the motorman. If desired, the motorman can oil the crank and rod bearings by means of an auxiliary hand oiler, this operation taking but five seconds. In case of a hot journal, emergency oil can be applied through this auxiliary oiler without the motorman leaving his seat. This feature also facilitates the oiling of the journals in starting when the weather is very cold. The materials employed throughout the motor as well as the construction are such as to insure the longest life to the machinery and minimize all chances of breakdowns. The engine is rated at 200 horsepower and is of the six-cylinder type, with provisions for air starting and reversing.



This 200 h. p. gasoline motor is said to transmit 96 per cent. of power generated to the driving wheels

The mechanical transmission is claimed to be highly efficient, transferring 96 per cent. of the power generated at the engine crank shaft to the driving wheels. A multiple disc friction clutch is employed, which gives positive action and greater efficiency due to the increased number of friction elements, the larger friction surface also tending to reduce the rate of wear and to considerably prolong the life of the clutch.



A standard gauge railway car driven by 200 h. p. gasoline engine. The car is 70 feet long and comprises three sections: baggage, smoking compartment and passenger section

Gasoline motor cars are quite low in operating costs as compared to steam trains. As an instance of the operating expenses, it may be stated that a gasoline motor car recently made an attractive record of covering over 5,000 miles during a month, earning $117 per day at a total operating charge of 14 cents per mile. A steam train would be far more costly to operate, since the crew would include an engineer, fireman and probably one or two trainmen as compared to a single motorman and train-

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man required by the gasoline motor car. Then again, the fuel and water required by the steam locomotive are more expensive than the gasoline and water for the motor car.

A GREAT NEW POWER HOUSE FOR SYDNEY

JUST how rapid has been the growth of the tramway system in Sydney, Australia, is best indicated by the fact that the commissioners of New South Wales have all but completed in that city one of the largest power houses in the world. The structure—whose walls are of brick and cement, and whose floors are concrete and steel—is 465 feet long by 242 feet wide, and the capacity of the plant is to be between 100,000 and 120,000 horsepower. Three of the 7,000-kilowatt turbo-alternators, with alternators that run at 750 revolutions per minute, and the condensing plants, have been supplied by English firms. American manufacturers will contribute a fourth unit of 7,500 kilowatt capacity, with an alternator to run at 1,500 revolutions per minute.

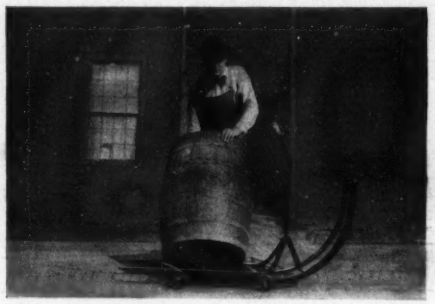
A DEVICE FOR HANDLING HEAVY MERCHANDISE

EVERY merchant and manufacturer who has occasion to move bulky or heavy articles from one place to another in his establishment will find one of the improved all-steel hand trucks, illustrated herewith, a very profitable investment. So practical and conveniently operated are these trucks that they are very rapidly superseding the old-fashioned hand trucks, as they enable employees to move heavy packages of merchandise much more rapidly and with less exertion than can be done with trucks of the old-fashioned types.

The lever handle raises or lowers platform of this stove truck three inches

An excellent example of their superiority for certain purposes is given in the accompanying engraving, which shows one being used for moving a large stove. As can be seen, the stove can be lifted from its place without tipping or changing its general position, thus enabling the clerk or porter to transport it to another part of the shop, so that it can be shown to a prospective purchaser under the most favorable circumstances. Every salesman knows the advantage of a customer seeing an article of this nature by itself, and how difficult it frequently is for a buyer to make up his mind which one he likes best when he sees a number together. Another feature, which must not be disregarded, is the natural dislike on the part of employees to move a bulky piece of merchandise when it calls for any great amount of exertion, even though it may be in a dark or crowded part of the store and its transfer to a well-lighted location where it can be properly examined might mean a sale. But when one of these improved trucks is at hand there is no excuse for the sales person neglecting to move any article to a place where it can be exhibited under the most favorable circumstances, no matter whether it be a stove, refrigerator, bale, box or barrel, as the work can be done so easily.

The fact that these trucks are constructed entirely of steel makes them exceedingly strong and no amount of strain and hard usage to which they may be subjected seem to have any effect upon them. The platform can be lowered to within four inches of the floor and then tilted to allow of easy loading. Then, by means of the lever shown in the illustration, it can be raised to a height of seven inches, this being necessary only when it is desired to lift an article under which the truck can be slid. It is

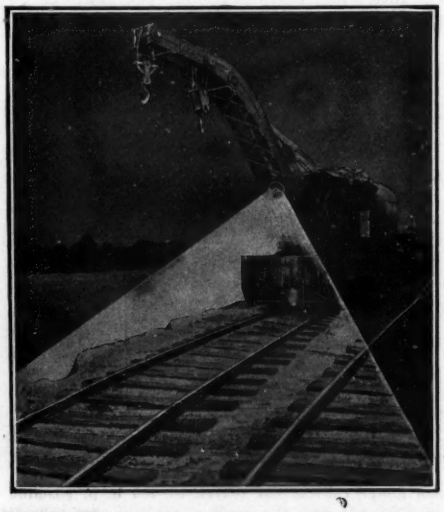


The heaviest barrels can be lifted and moved about easily with the aid of this truck

claimed that 800 pounds is only a moderate weight for the improved truck, and that many owners are using them for handling cases and bales weighing 1,200 pounds or more.

OUTDOOR ACETYLENE LIGHTING SYSTEMS

OWING to its simplicity and powerful illuminative properties, acetylene lighting has become popular for outdoor lighting and it is now employed by contractors, railways, fire departments, industrial plants, life-saving corps and by many others. A representative system for portable purposes consists of three main parts—an outer tank holding water, an inner receptacle holding the carbide, and a burner stand pipe. The lights are small and compact in size, being less than one-half the weight of oil lights of equal power. The apparatus is more quickly charged and put into operation than any other portable light made,



Acetylene headlights are particularly serviceable for railway wrecking train cranes

only water and carbide being necessary, while the action is entirely automatic. With this lighting system there is no possibility of an explosion.

The acetylene lighting system can be adapted to many diversified purposes. It has proved to be a most effective light for tunnels, sewers and mines—due largely to the ease with which it can be piped from a central generator to supply a series of burners as well as its extreme low cost. The flame is not affected by currents of air and requires little oxygen for its consumption—a most important feature in its favor when used in tunnels, mines or other underground work. For steam shovel and dredge lighting the acetylene system is equally commendable, since the

various lamps can be installed at the most advantageous points and connected by piping to the central generator.

Another important field of usefulness for the acetylene lighting system is presented by wrecking cars, lamps for this class of work being furnished with water-tight covers and with special provisions to withstand the excessive vi-

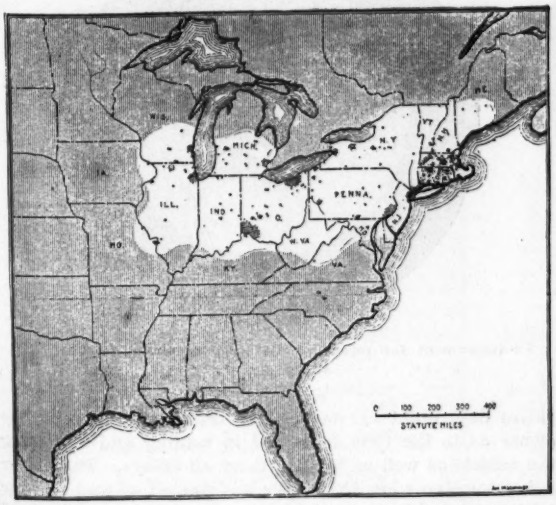
For tunnels and sewers, and other underground work, acetylene lights are very satisfactory

bration. One or two powerful reflected lights can be supplied from one generator or a series of smaller burners. This system is cheaper to operate than oil or arc lights and is extremely simple to handle. The light or lights can be made to follow the crane or shovel by being directly mounted on the moving arm, thus throwing the rays of light on the work. The lamps can be lighted instantly, require but little attention during use, and are unaffected by wind and weather.

Acetylene lighting systems are made in many different styles for all purposes. They range from small hand lamps to large equipments supplying several burners or lamps.

MACHINE-TOOL SHOPS IN THE UNITED STATES

THE latest report states that there are in this country 570 shops engaged in the manufacture of machine tools. As will be seen in the accompanying engraving, this important industry is confined to a comparatively



Courtesy American Machinist.

This small rectangle, one-tenth of the United States, contains 570 machine-tool shops

small portion of the country, that is approximately one-tenth of its area. Ohio leads, as regards the number of these concerns located within its borders, with 117 establishments, after which comes Massachusetts with 98; Connecticut, 66; Pennsylvania, 60; New York, 57; and Illinois, 42; bringing the total of the six States up to 440 shops, or 80 per cent. of the entire number. One-half of the remaining 130 establishments are located in Michigan, Rhode Island and New Jersey, and the rest are scattered so widely that it is not practicable to present them on the map. The dots on the unshaded portions of the map show the position in each State of the different factories and also the pronounced tendency which prevails to congregate in special localities. It will also be noted that the leading groups are especially well located as regards export facilities, being either at or near some large seaport, or on the main trunk line railways.

A CRANE OF LARGE DIMENSIONS

THE exigencies of modern shipbuilding and transportation have resulted in the production of numerous devices for assisting and economizing in the operation of these industries. No more convincing instance of these conditions can be given than by the accompanying illustration of the immense crane lowering into position the

Courtesy Shipping Illustrated.

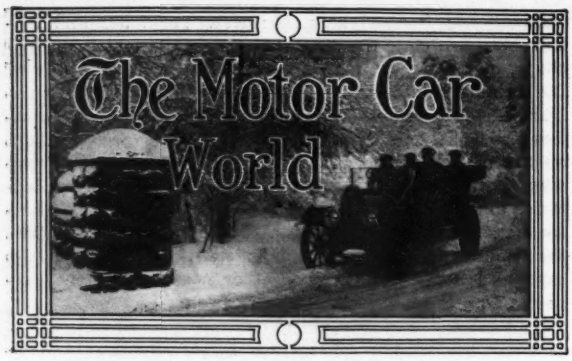
A 250-ton crane placing the outer casing for a funnel in position on the "Vaterland"

outer funnel casing of the new giant steamship *"Vaterland."* This crane, which is one of the largest in the world, will easily handle weights up to 250 tons. It has a working radius with a maximum load of about 230 feet, and with smaller weights up to 480 feet. Some idea of the height of this crane may be gathered from the fact that the funnel which it is shown placing in position rises 146 feet from the water. The crane is operated to a large extent by electricity, and can be readily manipulated and cared for by two men, a driver and an assistant.

CONVENTIONS AT THE PANAMA-PACIFIC EXPOSITION

IT is officially stated that 206 conventions now have been formally booked to meet in San Francisco in 1915 during the progress of the Panama-Pacific International Exposition. The last convention to be secured is that of the National Conference on Weights and Measures, which is composed of State weights and measures inspectors, city inspectors of weights and measures, manufacturers of weighing and measuring apparatus and federal officials.

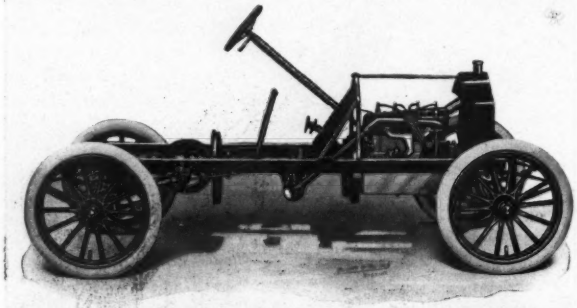
Three of the other recent conventions assured to San Francisco in 1915 are the American Association of Masters, Mates and Pilots of Steam Vessels; the American Druggists' Syndicate; and the American National Live Stock Association.



A GEARLESS SYSTEM OF TRANSMISSION

Combining both Simplicity and Efficiency, this System Claims Many Advantages

ONE of the leading features of a popular, low-priced American motor car is its unique system of gearless transmission, which possesses many noteworthy and distinctive features, chief among which are high efficiency,



Chassis of a roadster completely stripped to show gearless transmission, or friction drive

ease of manipulation, extreme simplicity, low maintenance cost and longevity.

This system of gearless transmission is centered about two main parts—a driving plate of special alloy connected to the engine shaft, and a friction rim composed of compressed fibre held on a jack or cross shaft that connects to the rear axle by means of chains. This construction eliminates the necessity of the usual clutch and accordingly renders the driving of the car much simpler. Changes in speed are effected by the shifting of the fibre rimmed wheel along the jack shaft so as to press nearer or farther from the center of the alloy driving disc. Thus, any ratio in speed can be secured between the engine driving shaft and the jack shaft by this simple means. A lever is provided for separating the driving plate from the fibre rimmed disc so that the motor car can be stopped while leaving the engine running.

Great economy is claimed to be one of the predominating features of this gearless transmission. The life of the fibre rim under normal conditions is between 3,500 and 5,000 miles, while the cost of renewal is exceedingly low—as a matter of fact it is considerably less than the cost of the grease that would be required in the ordinary gear transmission to cover the same distances. The extreme simplicity of this transmission also tends towards low maintenance costs, since the absence of many complicated parts assures the minimum opportunity for derangement and repairs, and also enables the average owner to readily understand the mechanism and make such simple repairs as may be necessary.

As for efficiency, the gearless transmission possesses the important advantage of offering a greater range of ratios between the engine speed and that of the driving wheels than can be secured from probably any other form of transmission, since any variation in ratio can be secured between the lowest and highest limits by the gradual shifting of the fibre rimmed wheel from the center of the driving plate to the extreme edge. With gear transmissions only two, three and sometimes four different ratios are offered, the intermediate speeds being effected by changing the speed of the engine. In hill climbing, traveling over rough or sandy roads, and in many other conditions encountered in motoring, the advantages of being able to select any speed best suited for the conditions will be found highly desirable—especially in view of the fact that the engine's speed does not have to be altered.

* *Readers interested in any of the articles here described may obtain catalogues and prices by addressing* SERVICE DEPARTMENT, DUN'S REVIEW, 290 *Broadway, New York, U. S. A.*

AN AUTOMOBILE TRAVEL RECORDER

A RECENTLY introduced automobile accessory that bids fair to become exceedingly popular for both pleasure and commercial vehicles, consists of an instrument for recording chronologically the work performed by the machine.

This device consists of an eight-day clock movement carrying a chart-dial and a recording finger that is operated by the vibration of the vehicle. When the automobile on which it is installed is standing still, with the motor running, a fine curved line is traced on the chart-dial. While the automobile is traveling, a broad band is marked on the chart-dial, which is printed with figures and lines to indicate the hours of the day and night as well as the days of the week. The recording finger automatically shifts each day to make a new circle, so that a complete record of a week's work is made on one chart. All the parts of the instrument are enclosed in a pressed steel case, 7½ inches in diameter and three inches deep. A glass front enables the driver of the automobile to see the dial record as well as the time of the day at a glance.

The instrument may be employed on either commercial or pleasure vehicles. When used on the former it furnishes the owner with an accurate report as to the work done with the vehicle. It records when the engine has been running and when the automobile is traveling—in fact, it accounts for every move made by the machine during the

An instrument for recording the work of an automobile, and of its engine

entire day, night or week. The instrument informs the owner as to the time consumed in loading and unloading the vehicle as well as the length of all delays. The owner can determine when the driver has wasted oil and fuel, or taken round-about trips. On the other hand, the driver of the vehicle is prompted to better work, knowing that each move of the machine is being recorded.

For pleasure vehicles the instrument is also very useful, although its most advantageous employment is confined to motor trucks and other commercial cars. When installed on a pleasure car it safeguards the automobile against unauthorized use in the absence of the owner, since

those having access to the machine know that a record is being made of every movement. The instrument also renders good service when touring by keeping a perpetual diary of the trip. With a few pencil notations on the charts the owner has a permanent and accurate record of his travels.

EXPORTS OF AMERICAN AUTOMOBILES BY COUNTRIES

During the Fiscal Year 1913, 993 Trucks and 24,293 Pleasure Cars were Exported

ONE of the most noteworthy developments in international trade in recent years has been the expansion of exports of American automobiles. At present these popular machines are being shipped to practically every country and colony in the world, while in several of the more important buying markets the number annually imported from the United States is little short of remarkable. For example, Canada purchased during the fiscal year ending June 30, 1913, 489 commercial vehicles, valued at more than a million dollars, and 6,723 pleasure cars valued at over $8,000,000. Great Britain in the same period purchased 184 commercial vehicles, valued at over $100,000, and 3,796 pleasure cars valued at nearly $3,000,000. Australia ranked third with more than 2,000 cars, valued at about $2,000,000; and the Argentine Republic fourth with 35 commercial vehicles valued at $78,000 and 1,062 pleasure cars valued at $1,181,735. The fifth in the list was British South Africa, with 11 commercial vehicles valued at $9,476 and 1,279 pleasure cars valued at $1,157,895. In an article appearing in DUN'S REVIEW in October, 1913, the number of cars shipped to South Africa was given as 7,279 instead of 1,279—obviously a misprint, although the values were stated as above. The next largest market is Brazil, which purchased 36 commercial trucks valued at $75,073, and 987 passenger vehicles, valued at $1,035,247. No other country imported over a million dollars worth, although the imports into New Zealand amounted to $992,038 for both commercial and pleasure vehicles combined.

The following table, prepared by the Bureau of Foreign and Domestic Commerce, Department of Commerce, gives the exports for 1913 in detail:

EXPORTS OF DOMESTIC AUTOMOBILES FROM THE UNITED STATES DURING THE YEAR ENDED JUNE 30, 1913

	Commercial		Passenger	
Countries —	Quantity	Value	Quantity	Value
Austria-Hungary	2	$3,595	135	$91,781
Azores and Madeira Islands	..	.....	16	10,549
Belgium	..	.....	94	85,679
Bulgaria	2	1,528	17	11,457
Denmark	3	2,120	81	77,149
Finland	..	.....	51	53,568
France	6	10,709	818	615,086
Germany	4	4,029	845	764,389
Gibraltar	..	.....	7	6,576
Greece	1	1,176	4	4,080
Iceland	..	.....	2	1,016
Italy	..	.....	331	280,961
Netherlands	2	4,489	111	94,163
Norway	2	2,200	78	66,689
Portugal	1	1,400	73	58,931
Roumania	12	12,000	38	30,337
Russia in Europe	13	34,163	580	484,913
Servia	..	.....	2	1,160
Spain	1	1,400	186	127,621
Sweden	..	.....	256	235,918
Switzerland	..	.....	22	24,965
Turkey in Europe	..	.....	13	9,814
England	184	119,468	3,783	2,893,785
Scotland	..	.....	6	8,104
Ireland	..	.....	6	5,538
British Honduras	..	.....	1	1,800
Canada	489	1,004,237	6,723	8,229,324
Costa Rica	2	3,643	13	14,955
Guatemala	..	.....	10	14,892
Honduras	1	3,000	4	8,100
Panama	..	.....	39	43,432
Salvador	..	.....	11	13,212
Mexico	35	83,363	235	423,123
Newfoundland	4	8,845	9	10,353
Barbados	..	.....	7	5,973
Jamaica	4	9,234	62	59,131
Trinidad and Tobago	..	.....	43	39,902
Other British West Indies	..	.....	7	6,716
Cuba	14	23,639	223	242,686
Danish West Indies	1	4,250	4	2,131
Dutch West Indies	..	.....	19	14,590
French West Indies	..	.....	5	3,877
Hayti	3	5,553	38	24,499
Santo Domingo	1	1,858	7	5,382
Argentina	35	78,000	1,062	1,181,735
Bolivia	..	.....	2	1,493
Brazil	36	75,073	987	1,035,247
Chile	..	.....	78	$109,982
Colombia	3	$6,112	110	113,334
Ecuador	1	2,017	74	55,272
British Guiana	..	.....	18	14,313
French Guiana	..	.....	1	558
Peru	..	.....	70	55,646
Uruguay	7	19,280	209	273,253
Venezuela	23	34,291	104	109,499
Aden	..	.....	15	7,998
China	..	.....	89	90,456
Chosen (Korea)	1	3,500	7	6,095
British India	..	.....	439	355,573
Straits Settlements	2	5,588	337	319,247
Other British East Indies	..	.....	39	31,245
Dutch East Indies	2	4,840	278	198,378
Hongkong	..	.....	7	6,673
Japan	21	32,770	312	364,507
Russia in Asia	..	.....	1	1,160
Siam	..	.....	56	35,934
Turkey in Asia	..	.....	1	824
Australia and Tasmania	17	23,027	2,083	1,896,990
French Oceania	2	3,400	11	14,005
New Zealand	1	1,201	958	990,837
Other British Oceania	..	.....	3	2,306
German Oceania	..	.....	1	350
Philippine Islands	43	91,809	517	577,040
British West Africa	..	.....	4	2,688
British South Africa	11	9,476	1,279	1,157,895
British East Africa	..	.....	14	12,802
Canary Islands	..	.....	10	6,426
French Africa	1	858	10	7,297
German Africa	..	.....	5	3,175
Liberia	..	.....	1	805
Portuguese Africa	..	.....	20	16,102
Egypt	..	.....	16	10,156
Total	993	$1,737,141	24,293	$24,275,793

THE ECONOMY OF THE AUTO TRUCK

NO better evidence of the economy of the auto truck could be obtained than through the records kept by the owners of a large mill in England who for years have transported most of their product to the railroad or other destination by means of steam and gasoline trucks. The firm in question uses both classes of vehicles, having discarded horses about ten years ago, with the result that all possibility of prejudice in favor of either is entirely absent.

In the case of steam it was found that when there were large quantities of heavy material to be moved, so that it was possible to hitch a number of loaded "lorries" or wagons to the steam tractor, and the distance was not more than 45 to 50 miles per day, the advantage probably rested with this class of vehicle. When the distance to be traversed, however, increased beyond that amount the gasoline truck was shown to be much the most economical. As to the amount of work done by the latter, a member of the firm stated that each of their 5-ton trucks displaced eight horses and four vans, and that the three men who constitute the crew of each truck can do more work than the four horse drivers and their mates. In addition to this, each motor truck can easily do an average of 20 miles more per day than the aggregate mileage of the four horse-drawn wagons.

The notable superiority of these trucks, as compared with horses, is forcibly demonstrated by the account of a single day's work. Leaving the mill with a full load of five tons at 6 o'clock, delivery was made 19 miles away. The truck returned and was again loaded by 10 o'clock, delivery made to a customer 5 miles distant, and back to the mill before luncheon. The truck was then sent out with 5 tons of flour, constituting 6 different consignments to customers at various point, some of which required the negotiation of several steep hills and a good deal of congested traffic. This example is not considered an unusual day's work for one of these trucks, as, taking the average mileage for a lengthy period it has been found that it amounts to about 80 miles for every nine hours, showing a speed averaging approximately nine miles per hour. It is that feature which constitutes the main factor of superiority on the part of the gasoline motor truck, there being no lost time on its part in stopping for water or in preparing it for service in the morning.

THE LATEST CHANGE IN THE MAP OF AFRICA is the amalgamation of Northern and Southern Nigeria into the single colony of Nigeria, dating from about January 1, 1914. The new colony has an area of 332,960 square miles and an estimated population of 18,000,000.

CENTRAL AND SOUTH AMERICAN REPUBLICS

UNTIL recently the student of economic conditions in Latin-America found the supply of material available regarding many of the South American republics and all of those in Central America to be exceedingly meagre, and for the most part very much out of date. This situation has been remedied to a surprising extent during the last five years as regards South America—a splendid series of authoritative books having appeared that covers nearly every republic, while numerous special works of great interest have also been issued. Central America during the last year has also begun to receive its share of attention, and it is gratifying to observe that it is not wholly omitted from the general review of the Republics of Central and South America just written by Mr. C. Reginald Enock,* author of "The Andes and the Amazon," "Mexico," etc. In this work the author concentrates his attention from start to finish on the natural resources and industries of the countries described, their relative degree of social and economic progress, and their existing and potential commerce. The fact that there are many books of travel and description relating to these countries renders this point of view especially timely and valuable.

On the whole, the work is admirably done, the author's wide experience with Latin-America giving an added value to every page. To those who contemplate a business trip in Latin-America, or the establishment of close commercial relations there, the long chapter on "General Physical and Social Conditions" will be found most suggestive and valuable. A separate chapter is devoted to each of the leading South American republics, a single chapter is devoted to Uruguay and Paraguay, and another to Colombia and Venezuela; while there is one chapter on Mexico and one relating to Aztec and Maya archeology. Unfortunately all of Central America is treated in a single chapter of less than 30 pages, a most inadequate space in which to present the salient characteristics of seven countries. With this exception, however, the book is a most satisfactory one, and will be found useful to both students and business men.

* *The Republics of Central and South America, Their Resources, Industries, Sociology and Future*, by C. Reginal Enock, F.R.G.S. Published by Charles Scribner's Sons, New York. Price, $3.00 net.

THE CULTIVATION AND USES OF THE BANANA

ONE by one the leading commercial staples of the world are receiving an authoritative treatment that, while by no means exhausting every phase of the subject, enables those interested to obtain practically all the information they require within the compass of a single volume. Such a book is "The Banana, Its Cultivation, Distribution and Commercial Uses," by William Fawcett.* The author—in addition to his own wide knowledge of the subject—has carefully consulted most of the leading authorities, besides receiving much personal assistance from many prominently connected with the industry, and the result is a book of the utmost practical value.

A brief introduction by Sir Daniel Morris alludes to the fact that fifty years ago all the fruit exported from Jamaica amounted to only £728, as compared with more than a million and a half sterling at present—the change being almost wholly due to the traffic in bananas begun by Captain Baker from Boston, the founder of the United Fruit Company. The author presents similar examples of the development of the trade from small beginnings in all of the principal Caribbean countries and colonies.

The work, as its title implies, is encyclopedic in completeness. The first seven chapters describe the banana plant, its planting, irrigation and drainage, cultivation and mulching, pruning, and harvesting and replanting. There is an interesting chapter for beginners, followed by chapters devoted to humus and fertilizers, fungus diseases, insect pests. Five chapters discuss the various uses of bananas, and three relate the development of the international trade in this great staple and describe how it is handled in both hemispheres. Then follow chapters devoted to a general review of cultivation in the leading banana growing regions, and three chapters of botanical information. A complete index renders this wealth of information readily available. The book is illustrated.

* *The Banana, Its Cultivation, Distribution and Commercial Uses*, by William Fawcett, B. Sc., late Director of Public Gardens and Plantations, Jamaica; formerly assistant, Botanical Department, British Museum, etc. Published under the auspices of the West India Committee, by Duckworth & Co., Henrietta Street, Covent Garden, London.

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PICTURESQUE PARAGUAY *

UNCONSCIOUSLY most writers of books of travel and description that treat of an entire country appear to adopt a somewhat stereotyped form of presentation. Mr. Macdonald in his book on Paraguay does not follow this example, but strikes out on new lines that make the work in many respects unique. There are several chapters devoted to sport—accounts of actual hunting experiences enjoyed by the author. Seven chapters are devoted to "Ramblings in Monkey Land," chiefly in search of game, with many interesting notes regarding the fauna and flora of this little-traveled region. The author gives some excellent accounts of the various colonization enterprises that have been started in the country, including the powerful Jesuit missions of the Spanish colonial period, the ill-fated Anglo-Australian colony brought from Sydney by the *Royal Tar*, and the fairly successful Government colonies of the present day. A very original chapter is devoted to "Health Notes for Hot Countries," in which the writer argues against the generally accepted theory of mosquit· origin for tropical malaria, asserting that tinned food, sedentary life, improper hours and lack of fresh air more often account for the disease—at least in subtropical Paraguay. He recommends fresh v.getables, fresh meats, plenty of outdoor exercise—even in the tropical sun. Many of the hints in this chapter will be found most useful, even by those who do not fully accept th· author's theories. Equally practical are the hints in the chapter on "The Tropics or Temperate Zones."

* *Picturesque Paraguay*, by A. K. Macdonald. Published by Charles H. Kelly, 23-25 City Road, London, E. C.

THE MODERN TRUST COMPANY *

IN this valuable work, the fourth edition of which has just been issued, the functions and organization of the modern trust company are explained in detail. As the development of these institutions has been a matter of comparatively recent date and as they enter very largely into the affairs of the commercial community, a thorough knowledge of their method of operations is very important to every business man. Up to the time of the publication of the first edition of this book in December, 1895, very little of an authorative nature had been written regarding the trust company, and the work was therefore very cordially received. In the latest edition all the matter relating to laws of the different States and to the rules and regulations of the Stock Exchange and Clearing House has been brought up-to-date, and considerable additions have been made to the text. The duties of the stockholders, directors and officers are fully described, and a very complete and clear explanation of the working methods of the various departments given under separate heads.

* *The Modern Trust Company, Its Function and Organization*, by Franklin Butler Kirkbride and J. E. Sterrett, C. P. A. Published by The Macmillan Company, New York City. Price $2.50.

THE AMERICAN YEAR BOOK FOR 1913 *

THE fourth issue of this valuable annual publication, covering the leading events and general progress of the year 1913, maintains the high standard established by earlier volumes, and while following the same lines, has been made more convenient for reference by the average reader. Although this book is not intended to take the place of those annual publications which give in detail statistics of elections, State and municipal governments, etc., it contains a vast amount of information that cannot be obtained from any other source, and as a work of reference will be found invaluable by those who find it necessary from time to time to settle questions of fact bearing on American events and progress in politics, economics, sociology, the sciences, the arts, etc. The volume is carefully indexed and cross indexed so that any desired subject can be readily found, and the fact that 128 contributors, each an expert in his special field, have cooperated in its compilation, gives a very good idea of its scope.

The American Year Book: A record of Events and Progress in 1913. Edited by Francis G. Wickware, B. A., B. Sc. Published by D. Appleton & Co., New York. Octavo, 892 pages. Price, $3.

Information For Buyers

As it is frequently impossible for advertisers to explain clearly the purpose or peculiar merits of their products in the advertising columns, space in this section is placed at their disposal to enable them to do so. It is proper to add that they, and not the publishers, are authority for the statements made.

Two New Motor Truck Models

THE Kelly-Springfield Motor Truck Company of Springfield, Ohio, has just announced two new chassis models. One of these, known as the K-35, is a two-ton truck and the other, the K-50, a five-ton. This makes a complete Kelly line of four sizes, the two earlier models being a one-ton and a 3½-ton chassis. The new models are designed and built along the same general lines as the earlier ones and the company believes that it now has a chassis of suitable capacity for every business requirement.

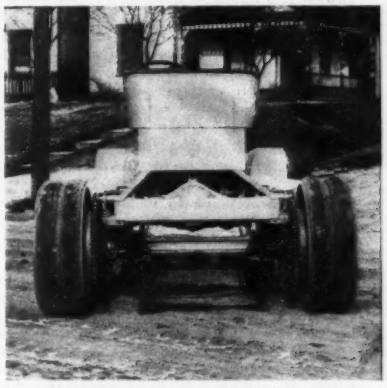
Chassis of the Kelly 5-ton truck, having a normal load capacity of 10,000 pounds—motor delivering 38½ horsepower at 900 revolutions per minute

The 1 and 3½-ton models made by the Kelly Company have been on the market for more than a year and have proved to be pronounced successes in every respect. The new models have been very thoroughly tested and the makers believe that they will give perfect satisfaction. Over-size tire equipment is the leading feature of both models. The 2-ton model is equipped with 36 by 4-inch single tires in front and dual tires of the same size in the rear. The 5-ton model has 38 by 6-inch single tires in front and 40 by 6-inch dual tires in the rear.

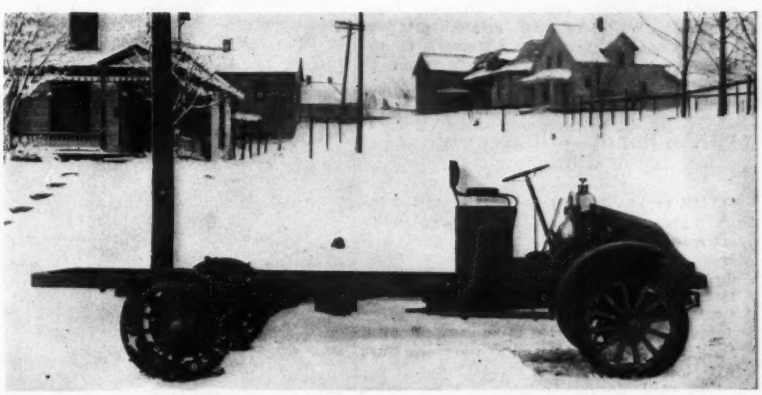
The 2-ton truck has a normal load capacity of 4,000 pounds and a gross load capacity, including weight of body, of 5,200 pounds. It is equipped with four-cylinder, water-cooled motor on a three-point support, the cylinders being 3¾ bore by 5¾ inches stroke and of the L-head type in monoblock casting. This motor is capable of delivering 25 horse-power at 1,200 revolutions per minute. A self-contained automatic system of lubrication circulates oil constantly by means of a gear-driven pump. The ignition system is also self-contained and cannot be tampered with. Cooling is provided for by a cellular radiator built in the dash and mounted on a flexible support, with gear-driven centrifugal pump at forward end of motor, and belt driven fan back of radiator. Motor control is by throttle only, the magneto automatically taking care of spark advance. Transmission is three speed and reverse, selective type, built as a unit with differential on jack shaft. The transmission shafts are in a vertical plane, giving access to gears without removing load or body. The standard wheel base is 144 inches, with 120 inches optional, and the chassis length is 17 feet, 6 inches, over all. Complete specifications of this model will be sent on request.

The five-ton truck has a normal load capacity of 10,000 pounds and gross loading capacity, including weight of body, of 11,200 pounds. The cylinders have 4½ inches bore by 6½ inches stroke and are T-head, cast in pairs. This motor can deliver 38½ horse-power at 900 revolutions per minute. Lubrication, ignition, cooling, motor control, clutch and transmission are the same on this model as on the two-ton. The standard wheel base is 150 inches, with 172 and 208 inches optional. The standard chassis length is 19½ feet over all.

The company publish a very handsomely illustrated catalogue describing Kelly motor trucks, together with a monthly publication of interest to Kelly agents and dealers. Firms interested in purchasing one of these trucks for their own use should state their requirements in detail in order that the engineers of the Kelly company may determine just which truck will be best adapted to take care of their work most economically and efficiently.



Rear view of the Kelly 5-ton truck chassis, showing solid construction



This 2-ton Kelly truck has a normal load capacity of 4,000 pounds and is equipped with a four-cylinder, water-cooled motor

Powerful Silo Fillers

A LINE of force feed cutters suitable for cattle raisers in all countries where corn fodder is preserved for winter feeding is manufactured by the Smalley Mfg. Co., 18 Broad Street, New York, U. S. A. These machines can also be used for cutting up such feed as cow peas, kaffir corn, clover, sorghum, sheaf oats, marsh hay, alfalfa and even green rye in bundles. The value of a feed cutter for farm use, the company declares, is due to the fact that cut feed enables the average feeder to save 80 per cent. of the corn crop that would be absolutely wasted if left in the field for the cattle to graze upon. This saving, as well as the increased profits of dairy, beef, sheep and hog feeders have been thoroughly tested by every University and Agricultural Station throughout the United States.

All Smalley cutters, when equipped with a special screen closely surrounding the knives, are able to grind a high grade of alfalfa meal for the farmer who wishes to manufacture meal on his own farm, instead of buying it at the regular market price. This device consists of a steel screen completely surrounding the knives, except where the feed passes from the feed rollers over the cutting plate. As the feed is cut up by the

knives, it has no outlet until it is broken up fine enough to pass through the small openings in the screen. For individual farm use machines in sizes 14, 16 and 18 have a capacity of 150 to 200 pounds of meal per hour. Larger machines with a capacity of two to two and a quarter tons of alfalfa meal per hour can be supplied. Samples of meal produced on one of the company's alfalfa mills will be mailed to parties interested.

The screen is so attached to the knife head on all Smalley cutters that it can be easily removed when the operator wishes to use the machine for regular cutting. This grinding device will appeal particularly to South American buyers who would like to manufacture their own meal and sell their surplus in trade centers or to neighboring ranches.

It has also been demonstrated that the average farmer who cuts up the feed he gives his cattle will not have to depend so much upon the old method of grazing. Well-filled silos now mean that the up-to-date farmer will have plenty of green feed for his cattle when pastures are dried up. Twenty acres of corn will keep cattle in better shape than sixty acres of pasturage. In territory where the climate is extremely warm kaffir corn is used for ensilage instead of regular ensilage corn. Dry weather seems to have no bad effect on this grain and only a small amount of rain is necessary to bring it to maturity in fine shape.

The rapid increase in the value of farm lands means that the average farmer cannot give up so much acreage for pasture lands as formerly, and the silo is becoming an important item in farm equipment, because it

The "Powerful Smalley"—a force feed silo filler—capacity, 20 to 30 tons per day

not only eliminates the fears of drought, but fattens cattle on a comparatively small acreage.

Agricultural implement dealers and other buyers interested should write for the company's illustrated catalogue showing these various silo fillers and alfalfa grinders. Correspondence should be addressed to the Smalley Mfg. Co., Export Department D, 68 Broad Street, New York, U. S. A.

An Improved Implement for Gardeners

THE rapidly growing popularity of the improved garden cultivator-hoes and weeders manufactured and marketed by C. S. Norcross & Sons, Bushnell, Ill., U. S. A., is indicated by the notable expansion in the sales in every part of the United States and in all foreign countries where they have been introduced. They are claimed to be more practical than the wheel plow and to do more work with less effort than the ordinary hoe.

The cultivator-hoe is made in three styles, 5-prong, 3-prong, and the "Midget" 3-prong hand weeder. The construction is such that whenever desired any number of the prongs can be removed, so as to allow for cultivation between plants that are growing closely together or on both sides of a row at one time. The prongs can also be attached to any standard wheel hoe or plow, which is thus transformed into a very efficient cultivator for use in large gardens or on farms. All materials used in the manufacture of these implements are guaranteed by the makers to be of the best quality obtainable, which ensures them long life and freedom from breakage under all ordinary circumstances. The handles are made of the finest white ash, waxed and belted and handsomely labeled, while the prongs are of high-grade spring steel, ¼-inch square, bent cornerwise and seated in V-shaped grooves above and below, which gives them solid bearings on four sides clamped to place by four strong bolts. The shovels are finished in silver bronze and the other metal parts painted a glossy black, giving them an exceedingly attractive appearance. Dealers or agents wishing to handle a profitable quick selling article of this nature should enter into communication with the manufacturers for the purpose of obtaining terms and other particulars, addressing them as above.

Group at left shows three-prong weeder and three and five-prong cultivator hoes; at the right a cultivator hoe attached to wheel plow

The Development of Cutterheads

THE introduction of the Shimer Cutterhead, some forty years ago, marked the beginning of a new era in matching lumber. Previous to that time the product of no two mills in the country would match into the same floor. It was only after the introduction of these time and labor saving tools that the several lumbermen's associations adopted certain proportions as the standard tongue and groove for certain thicknesses of flooring. Soon builders in making up their orders began to specify that the flooring to be furnished was to be matched with Shimer cutterheads. To-day standard sizes have become uniform the country over and flooring strips shipped from the State of Maine will fit the flooring strips coming from the State of Texas, and may be worked into the same floor.

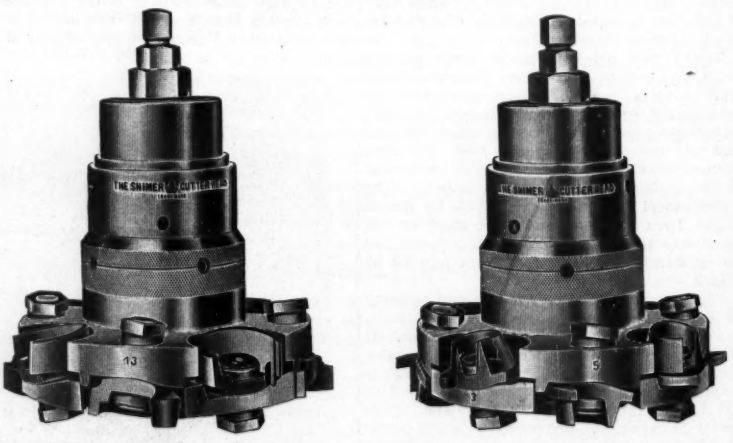
and it is doubtful if they will ever go out of use. How to work them economically with the tools at hand has, however, been a serious problem with the wood worker who desired to turn out good work at a fair margin of profit.

To meet this demand and to keep up with the race for supremacy among the makers of fast feed flooring machines, the manufacturers of the Shimer cutterheads brought out the line known as the "Shimer Limited." These tools possess many features of special merit and are made with four, six, eight or twelve bits to each head to suit the matcher upon which they are to be used, the feed desired and the kind of material to be worked.

In appearance the "Shimer Limited" series of cutterheads resemble the older patterns of these famous tools, but differ therefrom in the method of attaching to the spindle; in the construction of the bit seats; of the bit designed for faster cutting; in the greater strength of the holding bolts, and in the self-centering device which clings to the spindle when drawn up, securing it firmly thereto.

To match flooring at the rate of 150 to 250 lineal feet per minute requires side heads of perfect balance, and of undoubted strength, to withstand the enormous centrifugal strains and the hard knocks incident to matching all kinds of lumber at fast feeds.

The "Shimer Limited" cutterheads are made from solid steel forgings of 60,000 pounds tensile strength, which are shaped under a powerful steam hammer until the grain is further solidified and refined, making a tool which has no equal for strength. They are carefully balanced and the bits are jointed to insure all of them doing their share of the cutting.



Two "Shimer Limited" cutterheads, fitted with 8 bits to each head and differing from older patterns in method of attaching to spindle

The use of hard woods in housefinishing and other lines has also been constantly growing until now nearly every section of the world is contributing some wood of a hard or tough nature for this purpose. The fact that these woods take a handsome natural finish, and are more serviceable, especially for flooring, has given them a wide popularity

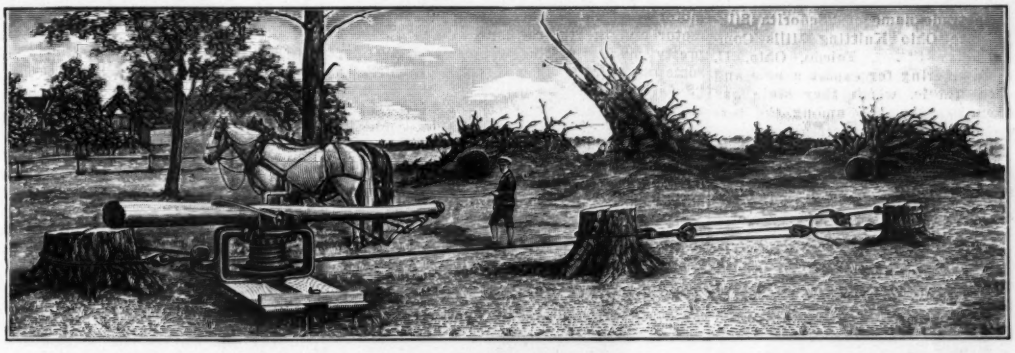
Machinery dealers and woodworking shops of all kinds should send for catalogue and pattern book illustrating the entire Shimer line of cutterheads for flooring, ceiling, siding, ship lap, jointing, doors, sash, blinds, etc., and showing the great variety of patterns that can be cut with these tools. Address Samuel J. Shimer & Sons, Milton, Pa., U. S. A.

A Triple Power Stump Puller

THE Zimmerman Steel Company, of Lone Tree, Iowa, U. S. A., are calling attention to their "Mighty Monarch Stump Puller," which they claim can be so adapted to various conditions that it makes a most effective machine for clearing off forest land as it will remove the stumps of the largest trees with the utmost ease. One of the advantageous features of this machine is the fact that it can be operated from one central point, the makers stating that it is supplied with an extra pulley, which when pulling stumps at a considerable distance from the machine, can be fastened to an intermediate stump, thus saving quite an appreciable amount of time. When pulling stumps larger than the anchor stump this pulley can be attached to an independent stump, thus providing a more stable base to pull against.

The improved cam take-up supplied with the "Mighty Monarch" simplifies the pulling of stumps at various distances, as the device enables the operator to pull a stump 20 feet away from the machine quite as well as at the full length of the pulling cable, as only enough cable necessary to pull the stump has to be wound on the drum. Another point in its favor is the saving of wear on the cable, as when the take-up is not used it is necessary to wind the cable one layer over another, which cannot help but injure it to some extent. Another advantage claimed is that by working the machine with an empty drum, much greater power is generated, as the team has the advantage of the entire leverage of the sweep over the drum. In fact, the manufacturers state that this take-up will enable the operator to pull at least 100 per cent. more stumps in a given time than would be possible without it, or even by using any other device of a similar nature.

With every triple power "Mighty Monarch" steel stump puller there are furnished two improved double power pulleys, which the manufacturers state are of the greatest value, as they not alone vastly increase the pulling capacity of the machine, but also widely extend its field of operations. Any one having use for a machine of this class will do well to write to the manufacturers for descriptive literature, which will be sent without charge to any address upon request.



The "Mighty Monarch" steel stump puller operating with triple power from anchor stump. This machine works as well at a distance of 170 feet as at 20 feet

Electric Pumps

ELECTRIC-DRIVEN pumping outfits for suburban and country homes, as well as city apartment houses and factories, have many advantages over other kinds of water lifts. They require only occasional attention, are quickly installed, cost from 5 to 10 cents per thousand gallons to operate, and minimize the fire risk. With an automatic pressure controller, an electric pump starts and stops itself when necessary, keeping water on supply at all times at a constant pressure, and requiring only an occasional oiling.

Many improvements, which have been almost exclusively limited to municipal electric pumping plants heretofore, are applied to pumps built in economical sizes for suburban homes by the George J. Roberts Company. In its most recent catalogue this company shows a line of "Gem" electric-driven pumps and Roberts water-driven lifts. Quotations are made on outfits adapted to suit every existing condition for maintaining an isolated water supply. The smallest sizes are belt-driven, while other types of varying capacity are connected direct by worm and gearing, by back gears, or by silent chain to a motor on the same base.

A very convenient pump for country homes, where the demand on the water supply is continuous and cannot be met by the smaller outfits, is what the makers term the geared power pump. This can be run by a gasoline engine, electricity, or by line shafting to which a washing machine, cream separator, or other appliance can also be connected. In the geared power pump, both pump and electric motor, wound to suit almost any central station or independent source of current, are mounted on the same base and connected through a line of machine-cut gears. The pump cylinder is brass-lined and of 3-inch diameter, with a 4-inch stroke. This machine will pump 900 gallons an hour, and is supplied with an electric motor of 1-horsepower, which will develop a pressure of 60 pounds.

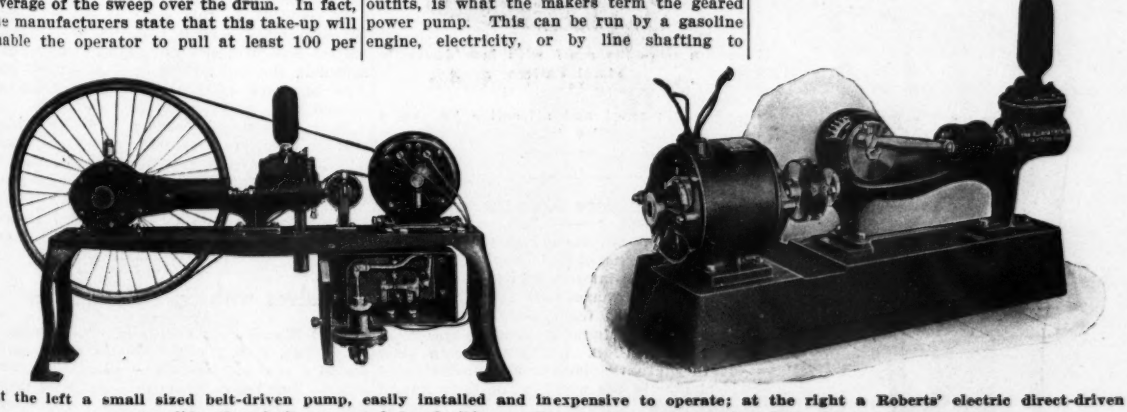
The "Duplex" pump is the most powerful type manufactured by the Roberts Company. It can be run by a 2-horsepower electric motor or gasoline engine mounted on the same base, and will deliver from 1,200 to 1,800 gallons of water an hour at a pressure of 60 pounds. It is made with tight and loose pulleys, to be run by a gasoline engine or line shafting, the power working through a 5-to-1 back gear to operate the pump. This pump is made in two sizes, one of 2½-inch cylinder diameter, and the other of 3, and both have a 4-inch stroke. The bearings are of steel and bronze, the cylinders are brass-lined, with cup leather pistons and rubber pump valves.

This firm also make the Roberts water-driven lifts, that they state have been in successful operation for 25 years and have found more than 35,000 users. They are made in three sizes, working under pressures of 50, 30 and 18 pounds. They are patterned after the most durable Duplex steam pumps, and the engine valves and seats have full port openings, which prevent clogging up.

Inquiries for further particulars regarding this line of pumps, and prices to the export trade, should be addressed to The George J. Roberts Company, Dayton, Ohio, U. S. A.

Pianos and Player-Pianos

THE piano dealer who is seeking a new connection with a manufacturer naturally prefers, if possible, to obtain one with a concern whose line is sufficiently broad and diversified to meet practically all the requirements of his trade. Such a line is the one made by Jacob Doll & Sons, Inc., 98-116 Southern Boulevard, corner Cypress Avenue, New York, U. S. A. This concern for several generations has been under the control of the same family, whose accummulated experience is therefore represented in its products. The line comprises both grand and upright pianos in a great variety of styles and



At the left a small sized belt-driven pump, easily installed and inexpensive to operate; at the right a Roberts' electric direct-driven water lift, the shaft connected by flexible coupling to the worm shaft, which drives piston pump

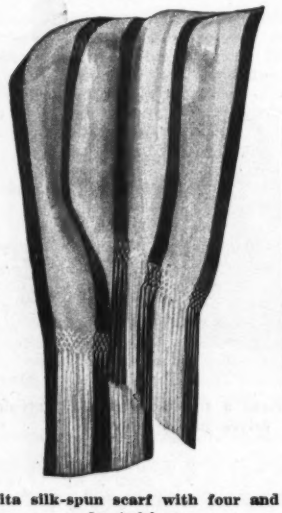
finishes, player pianos and a line of electric-pneumatic pianos operated by "coin-in-the-slot" attachments. The last mentioned instrument is known as the "Electrova" and is made in a variety of attractive designs with an automatic mandolin attachment and a special flute-violin attachment that can be had at a reasonable extra charge. Copies of the literature illustrating and describing this line of player-pianos and coin-operated instruments, together with export terms, will be sent to any address on request.

A New Fabric for Women's Wear

UNDER the trade name of "Señorita Silk-Spun," the Ohio Knitting Mills Company, 623 Cherry Street, Toledo, Ohio, U. S. A., are now offering for export a new and very beautiful fabric, which they state has already taken a high place among the textures required for the well dressed woman's wardrobe. By specializing in fine scarfs and mantillas the manufacturers have gradually developed new models from year to year that have greatly extended the uses for this fabric and broadened its market. During the past year they state that they have installed greatly improved types of machines by means of which they have been able to introduce wholly new designs and unique effects.

Scarf with large tassels

While this new fabric is not silk, the manufacturers state that their clients consider that it is not only handsomer than silk, but has many qualities that silk itself cannot rival. They state that it will wear like silk and can be washed as often as desired, without, in the least, dimming its remarkable lustre.



Señorita silk-spun scarf with four and five knot fringe

They add that its peculiar sheen and the delicacy of its filaments can only be compared with the exquisite hues of spun glass, so that it is in no sense an imitation of silk, but something entirely new and original.

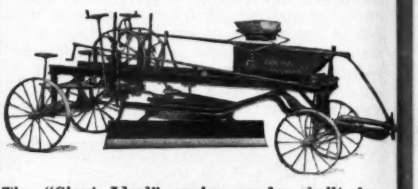
The accompanying illustrations will serve better than any amount of description to convey an idea as to the beauty of this new fabric and its appearance. In addition to these designs, the manufacturers offer many others, including scarfs for afternoon and evening wear, scarfs in lace design and Grecian patterns, etc. These can be furnished in the newest shades, tones and solid colors, or in striped or Persian effects. Some of the handsomest of all are rich creations in black and white, including some of the lace scarfs being made with the new machines. Other specialties include automobile veils, with double fringed ends or fancy borders, motor scarf clasps, face veils, chapeaux scarfs, motor and theatre caps, as well as a line of pretty mufflers. The last includes a handsome style of muffler for men, called the "Señorita Silk-Spun Reefer." All of these and many others are described in the literature published by this concern, copies of which, together with export price list, will be sent to any part of the world on request. The manufacturers are especially desirous of corresponding with houses in a position to handle this novel and attractive line on a large scale. Parties interested should address them direct, as above.

Señorita silk-spun scarf with lace design in Floral Pattern

Road Machinery and Culvert Pipe

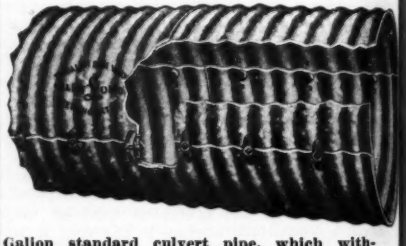
CONTRACTORS, road makers, and firms handling municipal and government supplies, will be interested in the very extensive line of road machinery and culvert pipe now being offered for export by the Galion Iron Works & Manufacturing Company, of Galion, Ohio, U. S. A. This concern state that they are the largest manufacturers of culvert pipe in the world, while their line of road-building machinery includes grading machines, drags, rollers, scrapers, plows, tractors, crushers, scarifiers, etc.

One of the accompanying illustrations shows the "Giant Ideal" engine grader. The manufacturers state that this machine is the most successful and practical traction engine grader that has ever been constructed. It is similar in design to the firm's regular "Ideal" engine grader except that it is made of considerably heavier material and is more strongly constructed to withstand the heavy strains and shocks incident to use with the traction engine. It has the same steering gear, which can be operated from the rear platform by one man, who has all the adjustments within easy reach. The makers state that with this steering gear the grader can be worked at a greater angle from the engine than is possible with any other engine grader steering gear on the market. The device, together with various special features of this machine will be found fully described and illustrated in the firm's catalogue, which comprises a great many other road machines for both horse and traction power.



The "Giant Ideal" engine grader, built for heavy work

The second illustration shows a cut-away section of the firm's Galion standard nestable galvanized corrugated culvert pipe. This is made of Sterling high-grade non-corrosive metal sheets, which are claimed to withstand the severest sulphuric acid corrosion tests. It is ready and suitable for shipment and easy to handle and is very easy to install, requiring only one man to set it up. No special tools are required to assemble the pipe. One man can easily set this pipe up and assemble it alone and with only a monkey wrench and punch for tools. In fact the punch is not really needed, but is handy to have to line up the holes should some of the sections become bent in shipping. Steel non-corrosive sheets will last longer in sulphuric acid under the ground or on top of the earth than any other material ever used in culvert pipe.



Galion standard culvert pipe, which withstands the severest corrosion tests

In addition to this style of culvert pipe, the firm make several varieties of cast-iron culvert pipe with special diagonal ribs for reinforcing the top and sides and holding the pipe in place after the earth has settled around it.

It is impossible to even specify separately the great variety of road-building specialties described and illustrated in the catalogue of this concern, but firms interested in this class of apparatus and equipment should write at once for copies of this literature and export terms, addressing the manufacturers direct as above.

Valves with Special Features

THE Wm. Powell Company, of Cincinnati, Ohio, U. S. A., announce that they have issued a new and revised catalogue in which will be found a complete description of their line of steam valves and other engineering specialties. Sectional illustrations are given of the different articles, with full views of their various parts, so that engineers and others interested in this class of goods can easily understand their methods of operation and the advantages claimed by the manufacturers. It is stated that the valves described in this catalogue are especially adapted for use on locomotives, in rolling mills, on steamships and, in fact, in all cases where extra heavy service is required. The catalogue also contains a price list of valves and parts.

Detachable Boat Motors Popular

THE Evinrude Motor Company, 139 E Street, Milwaukee, Wis., U. S. A., manufacturers of the Evinrude detachable rowboat and canoe motor, announce that they have practically completed arrangements through their export agents, Melchior, Armstrong & Dessau, 116 Broad Street, New York, for establishing a string of warehouses which will facilitate the distribution of their motors in all parts of the world.

The magnitude of this project and the great amount of time and money expended in actual use before it was placed on the market, thus giving ample proof that it was perfect in operation under all conditions of weather and use.

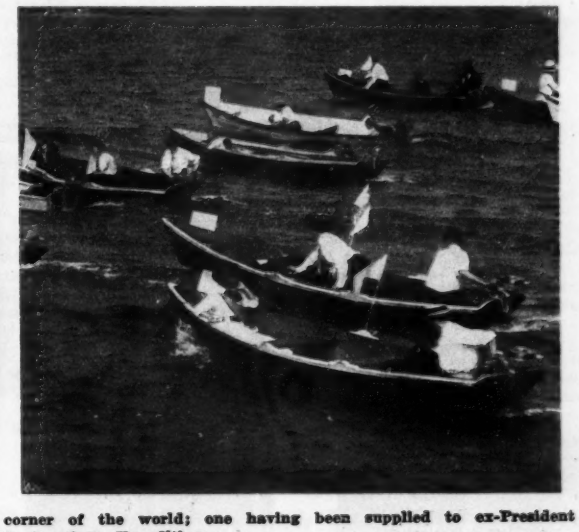
The Evinrude motor, when clamped to the stern of a rowboat, is quickly and easily adjustable to the proper position, and, notwithstanding the fact that no part of its weight of 50 pounds occupies the interior space of the boat, the latter remains in balance. Ordinarily, all gasoline motors are subject to troubles with the carburetor, but the Evinrude motor is provided with a gasoline shut-off which is said to eliminate this difficulty.

The manufacturers announce that they are

A rowboat fitted with Evinrude detachable motor—making an ideal motor boat for camps, waterside resorts, etc.

are accounted for by the fact that Evinrude detachable rowboat motors are already on sale and in use in nearly every country. The Evinrude Motor Company have accomplished this through the close co-operation of their export agents whose correspondents are sufficiently numerous to enable them to succeed in an undertaking of this kind, but foreign merchants who have been selling the Evinrude motor will find nearby warehouses most useful, if not absolutely necessary, since it is often embarrassing for a foreign merchant to receive orders and be unable to fill them promptly.

On the 1914 model of the Evinrude detachable rowboat and canoe motor will be found the Evinrude magneto which, besides eliminating 15 or 20 pounds of batteries, is particularly valuable on long trips. Batteries wear out quickly and if they are once dampened become permanently useless. On the other hand, no amount of exposure will in any way affect the Evinrude magneto, as it is



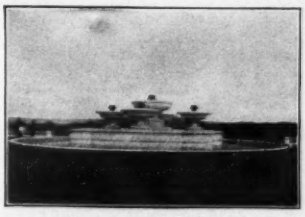
Evinrude detachable motors are now in daily use in almost every corner of the world; one having been supplied to ex-President Roosevelt for his South American Expedition

peculiarly constructed and placed within the fly-wheel for protection from injury. The motor has no bearings, brushes or commutators to wear out and it is not affected by the elements, waves or even complete submersion. The magneto was tested out for over a year now turning out 60,000 motors yearly and are adding continually to their list of foreign representatives. Responsible agents and buyers who are located in countries where there is any degree of water travel and who are interested in a light motor than can be attached to almost any style of boat, will do well to write to the company for complete details, directing their correspondence to the New York firm above mentioned, who are the export agents for this popular and practical little motor.

A Pure White Portland Cement

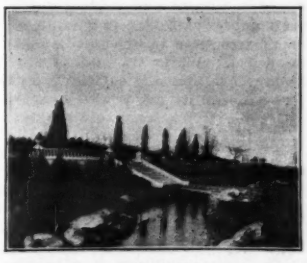
THE superiority of Portland cement for a great variety of building purposes has always been generally admitted, and its convenience, strength, durability and moderate cost has resulted in its steadily increasing use. In numerous instances, however, its unattractive color has proved to be an insurmountable objection to its employment in the higher class of ornamental work, and though various forms of plaster and slag cement have been used for a covering none of them give satisfaction, because of their inferior strength and inability to stand exposure to the weather.

In view of the foregoing the announcement of the Sandusky Portland Cement Company,



Fountain on a private estate, where Medusa Cement was used

of Sandusky, Ohio, U. S. A., that after a long series of experiments they have succeeded in producing a true Portland cement, perfectly white in color, that is equal in strength and other qualities to the best gray Portland cement, will be welcomed by architects, builders and contractors, who for a long time have been looking for a material of this description. The company has built a special factory for the manufacture of this prod-



An ornamental concrete terrace made with Medusa Cement

uct, which they have named "Medusa White Portland Cement," and are shipping it in large quantities to satisfied customers. The manufacturers claim that Medusa White Portland Cement is the first true white Portland cement ever made, and they guarantee it to be a high testing cement and pass standard specifications.

The company has recently prepared for gratuitous distribution to interested parties a handsomely illustrated catalogue in which specimens of the work done with Medusa White Portland Cement, directions for using, and prices are given.

A deep plate of Grecian design suitable for classic style interiors

A beautiful and artistic design for either ceilings or sidewalls

A plate showing rich and unusual deep embo effects with Grecian lines

Increasing Use of Decorative Stamped Metal

THE merits of decorative stamped metal for ceilings and walls are now so generally appreciated that it is being widely used for that purpose in practically every part of the world. While its undoubtedly superior sanitary qualities are sufficient in themselves to recommend its use, it also possesses the advantages over plaster or other kinds of finish for the interiors of dwellings, stores, churches, halls, theatres and similar buildings of being moderate in price, practically fireproof, attractive in appearance, easy to apply, and absolutely unaffected by changes in temperature, dampness or the attacks of insects. At one time the metal supplied for the covering of walls and ceilings and similar purposes was extremely plain, but during recent years its increasing popularity and steadily expanding employment have warranted the manufacturers in going to the expense of engaging artists of great reputation whose designs have been faithfully reproduced. Notwithstanding the greatly increased attractiveness of this metal sheathing, the employment of special machinery and dies for stamping the designs has enabled the manufacturers to place their product on the market at a lower price than ever before.

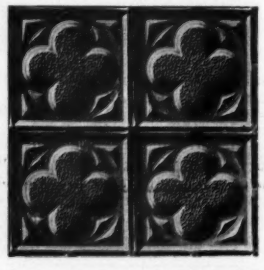
Among the American houses making a specialty of the manufacture of stamped metal sheathing is the Kanneberg Roofing & Ceiling Co., of Canton, Ohio, U. S. A. They state that their sheathing is made of metal never lighter than 29 gauge, and that the designs, eight of which are here shown, are clearly and sharply defined, so that the artistic effect of low relief can be properly obtained. The designs are so arranged that they are interchangeable, which results in a perfect fit and appearance of completeness that make them extremely attractive wherever they may be used.

In the accompanying illustrations an attempt has been made to indicate the faithfulness with which Kanneberg designs in decorative stamped metal embody the spirit of the leading architectural periods. In the complete catalogue several pages are devoted to examples of Greek and Roman designs suitable for every interior where classical styles would be most suitable. In the same way a number of pages are devoted to Romanesque and Gothic designs suitable for church interiors and many other places for which these noble styles are best adapted. With equal care the artists employed by the company have produced a series of Louis XIV., Louis XV., Empire and Colonial designs, all of which are faithfully reproduced in the large catalogue which the firm will send free to any address on request.

A special design harmonizing with a great variety of interiors

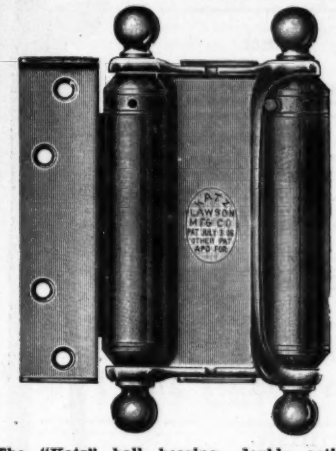
Besides carefully maintaining the artistic quality of their product the Kanneberg Roofing & Ceiling Co. devote particular attention to giving what they term special service to their customers. This means that anyone desiring to ascertain the most appropriate design for a room, store or other purpose, can write to the company and obtain styles most suitable for their requirements. The company do this because they realize the difficulty a prospective purchaser will find in selecting a design for a complete room from a catalogue, no matter how well it may be compiled. For instance, a design that might be excellent for a butcher shop would be entirely unsuited for a bank, and so on, and therefore the company place their facilities and experience at the disposal of their customers. Besides this, if a rough layout of the room, with a few details as to size, height of ceiling and lighting be sent, the company will select a design most in harmony with the surroundings. The company have prepared a handsome catalogue, in which will be found many illustrations of ceiling, cornice and wall designs, and also numerous details regarding methods of application, measurement and ordering. In this catalogue the firm included but a few of their many designs—just enough to show the wide range that it is possible to obtain in "Kanneberg" ceilings. For the buyer's convenience these are grouped under the various periods. If no "Kanneberg" design is suited to the customer's ideas, the firm are prepared to supply entirely original designs for his exclusive use. Copies may be obtained by writing to address given above.

Four plates showing different architectural styles—at the extreme left an "Empire" design, and next to it a "Gothic"; at the extreme right a "Louis XV." The fourth, while unclassified, can be effectively combined with many styles of border



A Line of Hinges with Novel Features

HARDWARE merchants, builders, architects or in fact anyone contemplating the erection of a new building will be interested in the very complete line of superior quality surface floor, jamb and screen door hinges offered by the Lawson Mfg. Co., 215 W. Huron St., Chicago, Ill., U. S. A. An illustration is given herewith of one of their leaders, the "Katz" ball-bearing, all-steel sur-



The "Katz" ball bearing, double acting jamb hinge

face floor spring hinge, to be used on doors from 1⅛ to 1¾ inches thick, which is claimed to possess a number of special patented features, rendering it superior to any article of the kind now on the market. Among these is a dustproof grease chamber which encloses and lubricates all the working parts of the hinge, and, in addition to a positive holdback, a lock at 90 degrees that will absolutely prevent any accidental release. The aligning feature is exceedingly simple and will hold perfectly when once set, while the steel balls upon which the pivot operates are enclosed in a case hardened ball race covered by a dustproof steel cap. The absence of the rapid backward and forward movement of the door after anyone has passed through, which is so annoying when the ordinary swing hinge is used, is another advantage dwelt on by the makers.

The upper illustration shows the "Katz" reinforced jamb hinge, which is stated by the manufacturers to embody certain practical mechanical features not to be found in other hinges of this class. The center plate, with drawn lugs or ears, is one solid piece of stamped steel, reinforced with ribs to the center. Both sides of the plate are flanged, thus giving extra strength to those parts bearing the weight of the door, preventing sagging and assuring an easy swinging action.

The "Katz" surface floor hinge; position of dust-proof grease chamber indicated

All the goods made by this firm are constructed of the best quality metal, planished steel, polished steel, wrought steel, brass and bronze, and in many different sizes, styles and finishes. The springs are of the highest grade oil-tempered steel wire. Every hinge is thoroughly tested before leaving the factory and is fully guaranteed against any defect. The company has prepared a handsome catalogue, in which are described and illustrated these hinges and other goods of a kindred nature, prices given and directions for ordering. Any interested party desiring a copy can obtain the same by applying to the company at the above address.

Crushers for all Purposes

AN illustrated folder describing their "Universal" and "Eureka" rock crushers has been prepared by the Universal Crusher Company, Cedar Rapids, Iowa, U. S. A., who manufacture these machines in 25 sizes so that every requirement for the reduction of rock, gravel, ore, coal and other materials can be met. Among those described in the pamphlet are the company's No. 1 Universal Crusher, a small model, which has been used with great advantage by tile and cement block plants; the No. 2 Universal, a size suitable for contractors and crushing plants of small capacity as well as for taking care of rejections from larger crushers; the No. 3 Universal intended for heavy work; and Nos. 4 and 5 Universal for large plants producing commercial sizes of crushed rock. The Eureka line is lighter in weight than the Universal and can be adjusted and equipped with jaws for producing very fine material. Also described is a Universal Duplex No. 2 for fine grinding, and an up-to-date portable crushing outfit for concrete and road construction.

All of the models are simple in construction and every part is interchangeable. The wearing parts are made of manganese steel and the others of crucible steel, and the manufacturers state that any repairs can very easily and quickly be made by the most inexperienced person. The adjustments for producing various sizes of crushed material can be made without changing any parts and without the use of tools. The company is desirious of establishing exclusive selling agencies, and buyers of contractors' supplies and road building machinery should write for this folder, as well as for a special pamphlet on portable crushing outfits. The sizes and prices of the models shown in the folder are given, but these constitute only a small portion of the extensive line of all-steel crushers, regarding which information will be sent upon application to interested persons in any part of the world.

Modern Excavating Machinery

THE Hayward Company, of 50 Church Street, New York City, N. Y., announce the publication of a new catalogue describing their extensive line of skid excavators, which are intended for use in every variety of excavating work, among which may be mentioned the digging of ditches and irrigation canals and the rehandling of sand, coal and other materials. Illustrations of the machines in operation under different circumstances and prices are given, and special attention called to the various styles of buckets and other distinctive features. The construction of the machines, the description of which are included in this catalogue, is extremely simple, and as they can all be easily knocked down for foreign shipment, they are meeting with great favor abroad. Those interested in machinery of this class and desiring a copy of this catalogue, which is printed in English and Spanish, can obtain one without charge by addressing the manufacturers, as above given.

Have you a clean, attractive Water Supply?

YOU can transform the dirtiest water into bright, clear, sparkling water; you can remove odor or taste, making the water pleasant and safe to drink if you will use a

LOOMIS-MANNING FILTER

The reason why these filters have come to be recognized as the leading filters for use in office buildings, hotels, hospitals, country homes, city homes and all kinds of manufacturing establishments may be stated briefly as follows:

Simple to Operate

The filter is cleansed by reversing the flow of water, which is accomplished by the movement of one lever operating the Manning Single Controlling Valve. This valve makes the care of the filter very simple and makes mistakes impossible.

Effective Results

The filter produces splendid results over long periods of time because the filter bed is kept in good condition by our system of cleansing it. The Loomis Cutting plate through which the bed passes under the action of the washing current breaks up the bed so that every particle is cleansed. The entire bed agitates every time it is washed. All accumulations are driven off through the waste line and the sight glass into any convenient sewer or drain.

Durable Construction

Only materials which will withstand the corrosive action of water to the highest degree are used in the construction of this filter. The outside casing is cast iron, the Manning Single Controlling Valve is solid bronze, the screens are tinned copper, pipe work is either galvanized iron or brass as desired.

They Filter All the Water

The entire water supply entering a building or residence, the water used in manufacturing, for bottling purposes or for boiler use can be made bright, clear and attractive. The filter is attached to the main supply pipe so that every drop of water passes through it. Full instructions for connecting up and for operating are sent with each filter.

The filters are built in many different sizes, styles and capacities. Inquirers should state the quantity of water desired to be filtered per minute or per hour, the condition of the water to be filtered, the pressure available, and the size of their supply pipe.

Loomis-Manning Filter Mfg. Co.

131 South 16th Street

Philadelphia, Pennsylvania, U. S. A.

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WE make a complete line of riding and walking plows for horse and ox hitch. One of the most popular riding plows is the "Success" which is very simple in construction and therefore very easily operated. It is strongly built and only two levers are required to make all necessary adjustments. Plowing can be done from 2 to 10 inches (25 C. M.) deep according to the condition of the soil. The rear wheel and seat can be removed, converting it into a two-wheel walking plow, if desired. Catalog No. 146 sent upon request.

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High Temperature Recorders

PYROMETERS for measuring and recording high temperatures are made by the Bristol Company, Waterbury, Conn., U. S. A. In these pyrometers the use of platinum and rhodium has been dispensed with, low-priced metal alloys taking the places of these expensive materials. The Bristol devices operate on the principle of thermo-electric couples and are small, compact and capable of withstanding pressure as well as rough usage. The instruments are so sensitive as to respond intantly to changes of temperature, and at the same time the operating parts are fully protected against ordinary accidents.

The field of this class of instrument is very large and covers practically every industry in which metals are heated to incandescence or melting temperatures, including the iron, steel, copper, tin and other industries; also super-heated steam and water gas plants; tempering, annealing and other installations. All electric pyrometers consist of the indicator-recorder proper, wire leads to the furnace-end, that protrudes into the space the temperature of which is to be recorded, and a switch permitting the instrument to be put out of operation.

Interested parties desiring catalogues containing full descriptions of these devices can secure same by sending their names to the company at the above address.

Up-to-Date Styles in Footwear

BUYERS of footwear will be interested in an attractively prepared catalogue now being distributed by the Hamilton-Brown Shoe Co., St. Louis, Mo., U. S. A. This catalogue, which contains more than 100 illustrated pages, includes descriptions of men's shoes in tan, patent leather, gun metal and other finishes; ladies' shoes in tan, patent leather, gun metal and white buck; boys' and misses' shoes for dress and rough wear; felt slippers; plush and fur trimmed comfort shoes; rubbers, boots, athletic and sporting shoes, and other styles for special purposes. There are also shown miscellaneous shoe makers' supplies, such as button cutting nippers, nail pullers, stretchers, trees, polishing sets, rubber and steel heels, laces, leggings, as well as a large number of metal window fixtures, show cases and ladders, etc. The catalogue is indexed, and each style of shoe described is given an order number which, when read backwards, denotes the price. By means of this ingenious system, the retail buyer can go through the catalogue and mark under each the retail price in plain figures, so that the customer can see the shoe and the selling price, yet without perceiving the wholesale quotation. Anyone interested in a carefully manufactured and up-to-date line of shoes should communicate immediately with the company, who are anxious to correspond with responsible dealers.

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The New LeA Rowboat Motor

Here is the Perfected Rowboat Motor

Live Dealers Wanted in all Parts of the World

simplified, lightened, strengthened and refined. May be attached to any rowboat in two minutes, and will drive the boat 8 miles an hour. Lighter in weight than most rowboat motors—fully as light as the lightest. Reversible engine—equipped with silent muffler—very responsive rudder—all underwater parts of bronze for use in salt water—has every good feature suggested by our 9 years' marine engine experience.

One Size--One Style--One Price

The price of this motor, ready to attach to boat and run, is..... **$70**

Dealers wanted all over the world. If you want to add this popular, big selling engine to your line, write at once for liberal dealers' terms.

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453 Horton Ave., Jackson, Mich., U.S.A.

The Fame of the

Steinway

the Piano by which all others are measured and judged, is not merely a local or national one. It is international, universal, world-wide, and is the recognition, in the strongest possible manner, of a work of art that is in its line unequalled and unrivalled.

¶ From its inception the Steinway Piano has been known as THE BEST PIANO, without qualification and without limitation.

Prices range from $550 to $1600 in American gold, f. o. b. New York

Catalogue on Application.

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DRIVEN BY AUTOMOBILE MOTOR

To Inflate Tires or Compress Air for Self-Starting

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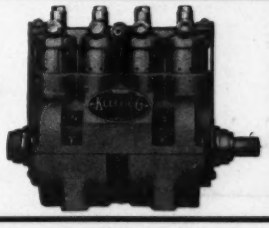

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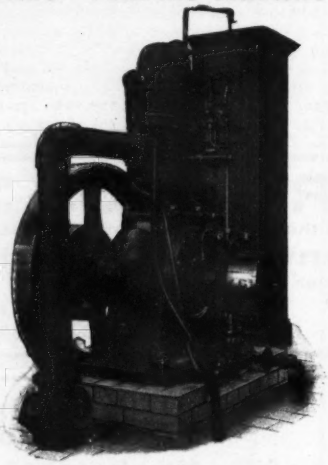

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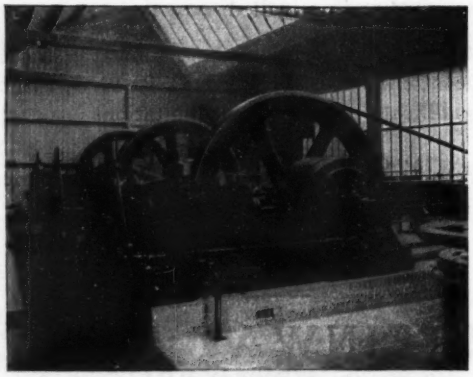
GAS ENGINES (Gasoline Kerosene, Naphtha, Suction Gas)

GOVERNS LIKE A STEAM ENGINE



Electrical Station fitted with ONGHENA Suction Gas Engines

ONGHENA Gas Engines are SAFE, SIMPLE, DURABLE, ECONOMICAL

4 to 200 B. H. P

NO PART HIDDEN, EVERY PART INTERCHANGEABLE

First Class Agents with Good References Wanted

REFERENCES: Carels Bros., Ghent. Van Acker & Co. " Ateliers de Constructions Electriques de Charleroi. BANKERS: Banque Centrale Gantoise, Ghent

Works:—ANGLO BELGIAN CO. Ltd.

Export Office:—FORCE & MECANIQUE Société Anonyme

23-25 Rue du Hainaut, Ghent, Belgium

Cable Address: Mecano Ghent. Code Used: A B C 5th Ed.

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